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NOTES ON THE COMMERCIAL GEOGRAPHY OF SOUTH AMERICA

By WALTER S. TOWER

Department of Geography, University of Chicago

Interest in South American commerce. Commercial possibilities are the chief factors stimulating general interest in South America. Western European countries, the United States and Japan are watching closely trade developments there and engaging in keen rivalry to gain new holds and strengthen old ones in the "great markets of this awakening continent." In the growth of existing trade relations geographical influences have been prominent, and in considering possibilities of commercial expansion various geographical aspects of the continent must be kept in mind. It is the purpose of this article to point out some of the larger relations between South American geography and commerce. At the same time some non-geographical factors affecting commerce may be noted in certain connections in order to make clear the relative importance of geographical influences.

Factors affecting the commerce of South America. Among the many things affecting the commerce of South America the following, especially, must be considered: (1) the distribution of the population, its density, and its character, particularly as regards producing capacity and purchasing power; (2) the location, extent, character and resources of the productive areas; (3) the accessibility of the continent and its various parts, or the influence of coast lines, topography and rivers on transportation facilities; and (4) the location of the continent with respect to other lands.

Certain general relations under each of these heads may be noted at the outset.

Population. South America has a smaller population than any of the other major continents,¹ both in actual numbers (about 50,000,000) and in density per square mile (about 7). With about $\frac{1}{3}$ of the land area of the world, it has not more than $\frac{1}{8}$ of the world's population. The chief reasons for this lack of population have been: (1) the strangling effect of the Spanish colonial policy, by its restrictions on colonization, commerce and many industrial activities; (2) political instability in most of the countries for many years following the wars of independence; (3) popular ill-repute of the whole continent on account of the unhealthfulness of some parts; and (4) the counter attractions of vacant lands elsewhere (notably in the United States) more readily accessible for European emigrants. For the most part these retarding influences no longer apply, even the unhealthful regions being more and more circumscribed as more is known about the continent and as sanitary advances are made. It may be assumed logically, therefore, that South America eventually will have a population more nearly proportional to its area. That fact alone means great possibilities of commercial expansion.

South America is well populated only along parts of its borders, while a large area, at least 3,000,000 square miles, in the interior averages less than 1 person per square mile. The chief reasons for this uneven distribution are: (1) the small total population of the continent; (2) the relative inaccessibility of many interior sections; and (3) tropical climate, dense forests and diseases to be contended with in other parts. The presence of hostile savages also may be noted as a deterring influence on settlement in some sections, though their presence is due largely to the factors already mentioned. If these vast interior areas can be populated, even as densely as the borders now are, great advances in commerce ought to result. Means of transportation are the things most needed, and, when they are provided for the interior sections, there will be much increase and spread of population.

In character, the population falls into three fairly definite classes: (1) the white population, mainly Latin European, with smaller numbers of English, Germans and others; (2) the native Indian and the imported negro population, the latter mainly in Brazil; and (3) the population of mixed blood (European with Indian or

¹ Australia is not considered a major continent.

negro). The truly white population probably does not exceed one-fourth of the total; it is the most capable and most progressive group and is found largely in the cities and towns. Indians and negroes probably make up another fourth of the total, with most of the former in the remote places and but little advanced in civilization. The remaining half is of mixed blood, with the Indian and negro elements predominating in the majority of the group. Thus the larger part of the population (the Indians, the negroes and the half-breeds, who are mainly of native or of negro blood) are of relatively low order, kept so partly by their surroundings, with a low producing capacity and small purchasing power. Much more than half of the continent has almost solely this less capable and less progressive sort of population. Few groups are entirely hopeless, but fairly large numbers can be expected to advance only slowly to a plane where they will contribute much toward the commercial progress of the continent. Hence, for a good many years, effective peopling of the vacant areas must depend mainly on desirable immigration (chiefly from Europe) and the natural increase from the upper half of the present population. The extent and distribution of growth attained in these ways will influence vitally future trade relations. The places most attractive to immigrants, and those now occupied by populations largely white, have the best prospects for increasing greatly their commercial importance. Such places, for example, are found in the temperate countries particularly and in the southern half of Brazil.

Productive areas. South America ranks high among the continents in relative extent of potential productive area, for next to Europe it loses the smallest share of its area from aridity and from polar cold (not more than an eighth), and has the largest share of broad low plains (more than half). Actual development of these usable areas, however, is hampered by (1) highlands which border the continent and prevent ready communication with the interior; (2) dense tropical forest covering about 10 per cent. of the continent, and mainly on the lowlands; and (3) tropical heat, annual floods, and various diseases, especially fevers. The productive areas of South America can be made to yield almost all things, but as far as is known, the continent is notably deficient in coal, when compared with North America, Europe and Asia. Some large water power resources offer a partial compensation for lack of coal, but apparently the continent as a whole and most of its parts never will feel the effects of abundant, cheap power. This defect in productive

areas must have a very far-reaching influence on the lines followed by commercial expansion.

Accessibility. As far as mere access to its coast is concerned, South America is unsurpassed, for no part of its coast is truly inaccessible. In general, however, its coast line is too regular (less than twice as long as the shortest line capable of enclosing its area) and too extensively bordered by abrupt highland barriers to have the greatest commercial value. For these reasons only a very few places have a combination of good harbors and good routes to the interior. Rio de Janeiro, for example, has a magnificent harbor, but from it a rather abrupt ascent is necessary to reach the interior. Buenos Aires, on the other hand, has unsurpassed ease of access to the interior, but many millions of dollars have been and still are being spent to give it a good harbor.

This handicap of regular coast and bordering highland is partly offset by the three great systems of navigable rivers, the Amazon, the Rio de la Plata and the Orinoco, a combination which, for natural commercial efficiency, is equaled by no other continent, though the area which the Amazon serves presents many difficulties to general development. It must be noted also that railroad building across the great interior lowlands will be extremely easy (because of topography) except where the problems of the equatorial forest or extensive annual floods must be overcome. Neither of these difficulties is as serious as the general absence of fuel to operate great railroad systems.

Relation to other lands. In its relation to other lands, South America is not especially well favored. Africa is really its closest associate, but Africa is the least important continent commercially, and in commercial progress is likely to develop along lines similar to those followed in South America. Hence little intercourse between these continents is likely. On the other side, South America faces only Australia, 7,500 miles away, which offers, on a smaller scale, about the same sort of prospect as Africa. Of the other continents, Europe and North America are its closest associates, and for various reasons the most logical with which to have trade relations. Thus for most of the continent foreign markets always have been remote and on the other side of the equator. Various lines of traffic, as in perishable foodstuffs especially, have felt and will continue to feel the effects of this situation.

Value of commerce. The general effect of the factors noted above

has been to retard the commercial development of South America (Fig. 1). Commercial progress, it is true, has been relatively rapid in the last decade, owing largely to increased immigration, improved transportation facilities and the resulting internal expansion in the leading countries. But the combined foreign trade of all South American countries has not yet reached two billion dollars in a year.² This is much less than the value of exports from the United States, and is hardly more than equal to the total annual trade of the Netherlands. It should be noted in fairness, however, that in proportion to its size and its population, South America is commercially more important than Asia, for Asia has a total foreign trade less than twice as great as that of South America, while its area is two and a half times and its population more than sixteen times as large.

The total trade of South America in 1911 was about \$1,835,000,000, made up of \$942,000,000 of exports and \$893,000,000 of imports.³ The apparent balance of \$50,000,000 in favor of South America is offset largely by interest payments to foreign holders of loans and investors of capital and by freight charges paid the foreign carriers engaged in South American trade. This condition is the logical one for regions which have not gone beyond the first stages of exploiting their natural resources, as is the case in all of South America. Furthermore, this condition probably will continue for a long time, because (1) there are large areas and extensive resources as yet hardly touched; (2) these chances for internal development will keep most of the native capital at home and attract

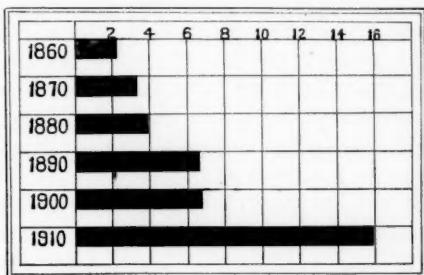


FIG. 1.—Diagram showing increases in combined totals of trade of the four leading South American republics, Argentina, Brazil, Chile and Uruguay, from 1860 to 1910. Values expressed in hundreds of millions of dollars.

² All statements concerning commercial values, quantities, rank, etc., refer to the year 1911 unless otherwise noted. That year was typical except for reduced shipments of maize owing to partial failure of the Argentine crop. Values of exports from Argentine ports were consequently somewhat lower than the normal.

³ Statistical data have been drawn from various sources, chiefly from official summaries of trade for different countries, from the *Bulletin of the Pan-American Union*, and from the *Statesman's Year-book*. Conversion of values to United States dollars has been made on the basis of equivalents used by the U. S. Department of the Treasury.

more foreign capital; (3) government loans placed abroad are likely to increase, as more funds are needed for public works; and (4) most of the carrying trade of the continent will remain largely in foreign hands as long as South American capital can find investment in ventures more profitable than ship-owning.

Contrasts of exports and imports. There is a marked contrast in the character of exports and imports. The exports are almost entirely products of the farms, ranges, forests and mines: materials for manufacturing and food-stuffs—mainly bulky commodities of comparatively low value for their bulk. Manufactured wares⁴ are noticeably absent (less than 4 per cent. of the total), because most sections of the continent offer the people better returns from exploiting natural resources than from factory labor. The total investment of capital in South American manufacturing establishments is less than a billion dollars, while the value of manufactured products is much less than twice that figure,⁵ or probably not more than \$30 per capita. This makes the capital invested in, and value of products of South American manufacturers not as great as the corresponding figures for the city of New York, while the per capita value is about one-seventh as large as for the United States in 1910.

The sparse population, the character of much of the population, the lack of power resources, and the large opportunities in other lines of industry have kept down manufacturing enterprises mainly to the few basal ones which almost every region must have. As a result of these conditions the imports are largely manufactured or partly manufactured wares, of relatively high value for their bulk. Imports of coal and of lumber are the only notable exceptions to this rule. For reasons already noted the continent ought not, and is not likely, to develop manufactures on any large scale in the near future. Hence it will continue to be primarily an exporter of raw materials and an importer of manufactured wares. Growth of population, and progress in developing natural resources will determine largely the rate of expansion in both these respects.

Chief products exported. As is typical of most regions where exploitation of natural resources is the chief kind of activity, a few commodities make up the major part of the export trade. More than 80 per cent. of the value of South American exports in 1911 was contributed by ten kinds of commodities in order of value as

⁴ Nitrate and smelted metals are not classed as manufactured wares.

⁵ The latest statistics for the leading countries, Brazil, Argentina and Chile, give a combined value of about \$500,000,000 capital invested, and about \$720,000,000 value of products. It is safe to conclude that the totals for the seven other republics are not as great as for these three.

follows:⁶ coffee, nitrate, rubber, wheat and wheat flour, wool, hides and skins, meats, metals (gold, silver, copper, tin and platinum) and their ores, linseed and cacao. It is significant that only three of these, coffee, rubber and cacao (about 35 per cent. of all exports) are tropical products in the sense that they are produced only in the tropics. In spite of the fact, therefore, that three-fourths of the continent is tropical, South American exports are largely non-tropical products.

Coffee is by far the most valuable product, for more than one-fifth of the total value of exports is contributed by coffee shipments from Brazil, Venezuela and Colombia. In 1911, the value of coffee exported (about \$218,000,000) was twice as great as that of any other product. Wheat commonly ranks first in tonnage (2,500,000 to 3,000,000 tons) with nitrate recently a close second (2,500,000 tons), while good crop years with active foreign demand make corn a rival of both. Brazilian coffee and rubber, Chilean nitrate and Argentine wheat, in combined value, made up nearly 50 per cent. of the value of exports in 1911. Rubber is gathered mainly from wild trees in the Amazon basin. The other three, coffee, nitrate and wheat, are produced from an area of not more than 1 per cent. of the continent.⁷ It is apparent, therefore, that in production South America is still almost primitive.

Chief wares imported. South American imports are mainly manufactures of many sorts. Owing to lack of uniformity in listing imports, only approximate values of leading imports can be secured. Two classes of wares, however, stand out prominently, textiles and the manufactures of iron and steel. Iron and steel manufactures exceed 10 per cent. of total imports. Cotton manufactures exceed in value all other textiles, and equal about 10 per cent. of the total imports. For the climate of most of the continent cotton goods are more suitable than woolen, and being cheaper than linen and silk, cotton supplies the only suitable textile within the purchasing power of perhaps half the people. Textiles other than cotton are a close third, and coal probably is fourth, in value. But the combined values of these leading four groups is not more than two-fifths of the total. It appears, therefore, that a great many wares, in varying amounts, make up South American imports.

⁶ Unless otherwise noted statements concerning export, import and total trade include the trade between South American countries (intra-continental trade). Obviously duplication (about \$65 000,000) is involved, since exports from one country appear also in the imports of others.

⁷ This figure allows 7,500 sq. miles for producing nitrate fields; 26,500 sq. miles for Argentine wheat; and 38,000 sq. miles for yielding Brazilian coffee plantations.

In tonnage, coal is far above any other import, more than 7,000,000 tons annually being taken for railroad and industrial uses, mainly by Argentina, Brazil and Chile. This amount equals the combined export tonnage of nitrate, wheat, corn and coffee, and most of the coal goes to those countries which supply the heavy tonnage of exports. Coal is largely the incoming cargo of vessels which take away shipments of nitrate, wheat, corn and coffee. An upset in the world's coal trade, as during the British coal strike in 1912, reacts unfavorably on this export trade from South America. Vessels to take Argentine grain, for example, were not as numerous as usual in 1912, because without coal to carry they would not make the long voyage to Argentine ports. As a result, much difficulty was experienced in marketing the crops. The ability to get coal cheaply in these return cargoes is one of the most important aspects of all South American trade. For example, Argentine railroads depend almost entirely on imported fuel (a few far interior lines use wood); and getting the crops to the seaports depends on the railroads.

Contrasts between ports. These contrasts between the wares exported and those imported lead to differences in the ports through which the shipments pass and in the nature of the carriers serving the ports. The small area used to produce the bulk of the exports has helped concentrate much of the export trade in three groups of ports—the Brazilian coffee ports, the Argentine grain and animal product ports, and the Chilean nitrate ports—near the producing areas. Some of the ports which figure prominently in exporting receive almost no imports except an occasional cargo lot of coal or lumber. On the other hand the imports, particularly of manufactured wares, seek ports which are in themselves important markets or which serve as distributing centers for a populous region. Thus leading importing points differ in numerous cases from the list of leading exporting ports. The importing centers are served largely by liners plying on more or less regular schedules, the exporting ports also may have liner service, but much of their traffic is carried by freight steamers of the "tramp" type and by sailing ships. Few South American ports handle large amounts of both imports and exports, for few of them serve areas which are important producers and at the same time offer large markets for imports.

In 1911 there were 58 ports having a one-way commerce of \$2,500,000 or more: 34 on the east coast (or on rivers draining to it); 18 on the west coast; and 6 on the north coast (or on rivers

draining to it).⁸ Of the 58, more than half (32) were chiefly exporting points, that is, their shipments were more than twice as great as their receipts. There were 10 chiefly importing ports (receipts more than twice as great as shipments), and 16 had more or less evenly balanced traffic, but only 10 of this last group had a total trade of \$10,000,000 or more. The limitation of producing areas largely to the borders of the continent and the production of commodities well suited to shipment in whole cargo lots account for the ability to develop so many places of exportation. At the same time the absence of concentration of population and of extensive systems of internal transportation have made necessary the growth of a correspondingly large number of importing centers. Size of local population and extent of distributing routes from a given port influence largely its rank as an importer.

Contrasts between east coast and west coast. There are significant contrasts between the commerce of the east and of the west coast, especially as regards value, distribution and products handled.

(1) *Greater value of east coast trade.* East coast trade is much larger than west coast trade (Fig. 2). The tonnage of vessels entering and clearing from ports on the west coast is relatively large, but mainly because nearly every west coast line vessel touches from six to twelve or more ports each way (for mail and passenger service), not infrequently doing little or no cargo business at most of them. The case is different on the east coast, where each line vessel touches fewer ports (in most cases only four or five) and commonly handles a good deal of traffic from each of them. Value of trade, not tonnage entering and clearing, is, therefore, the only fair way of comparing the coasts. In 1911 the value of exports from the east coast (about \$704,000,000) was more than three and a half times, and the value of imports to the east coast (about \$675,000,000) was nearly four times the corresponding movements on the west coast. Buenos Aires alone has a greater value of traffic than the entire west coast. The principal causes for this difference between east and west are: (1) The west coast has been more largely cut off from world markets, owing to the long and dangerous voyage around the southern end of the continent. (2) The main products of the west coast, except nitrate, must be marketed in keen competition with supplies from more favorably located places. (3) The Andine barrier cuts down the area naturally tributary to the west

⁸The Guianas, being colonial possessions of European countries, are not included in this discussion.

coast to less than one-fifth of the continent. (4) The larger part of this area is arid land or rugged highland. (5) There are no navigable rivers offering routes into the interior, and other means of transportation are not readily provided. For example, between latitudes 5° and 35° S. there is no pass across the Andes at an elevation less than 11,000 feet, the difficulties confronting railroads

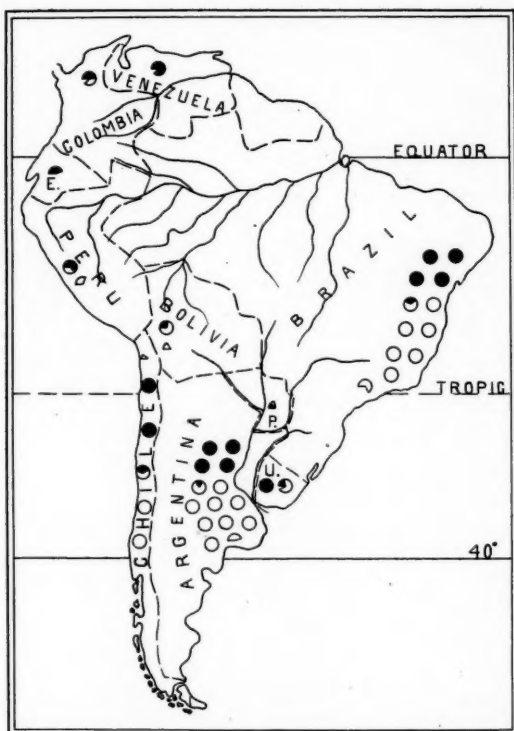


FIG. 2.—Map showing distribution of foreign commerce of South America by totals for each republic in 1911. Each circle represents \$50,000,000. Shaded parts of circles show relative totals for 1895. P.=Paraguay. U.=Uruguay. E.=Ecuador.

being indicated by the fact that the Oroya line (Peru) is forced to attain an altitude of 15,645 feet in a distance of 106 miles from the coast. (6) The railroad mileage is consequently small, being only 1 mile of railroad to each 350 square miles of area, and much of the mileage, as in Chile, is parallel to, instead of transverse to, the

coast. (7) The population served is less than one-third that of the continent, and except in Chile, most of the population is living in the Andine Highland, in large part reached only with difficulty. (8) The white population in the area tributary to the west coast is small, while much of the population outside of Chile is of the less progressive mixed type or Indian. The Indians and half-breeds mainly of Indian blood (numbering fully half the total) do not represent large producing capacity or large purchasing power.

The opening of the Panama Canal will alter one of these factors in a vital way—namely, access to the world's markets. This change undoubtedly will increase west coast traffic, but many other changes also must come before the west coast trade (now about \$380,000,000) can attain even the present magnitude of east coast trade. Chile contributes more than five-eighths of west coast total trade, and about two-thirds of west coast exports (about \$196,000,000), partly because climate and topography have tended more to retard economic development in the other countries. Three-fourths of the value of Chilean exports are from nitrate (about \$95,000,000). Take that trade away and west coast exports have less value than Santos coffee shipments. Take away the imports that are paid for by nitrate shipments and there is left a value of imports less than those entering Rio de Janeiro. The nitrate trade may increase much, but even at the present rate of production its life probably will be less than fifty years. West coast trade apparently never can rival east coast trade because of the limitations noted above, and many years of painstaking development will be needed to make other, more stable lines of trade overtop the nitrate traffic.

(2) *Concentration of east coast trade.* East coast trade is concentrated in two groups of ports (Fig. 3): (1) the southeast Brazilian group, chiefly Rio de Janeiro and Santos; and (2) the Rio de La Plata group, the most important of which are Buenos Aires, Rosario, Montevideo and La Plata. Ten other lesser ports, however, come in the second group, all of them being exporting points to a marked degree, for their combined shipments are more than three times as great as their receipts.

These two groups of ports handle more than 80 per cent. of the total trade of the east coast.⁹ The leading six named above handle more than 75 per cent. of the east coast imports, but only about 65 per cent. of the exports. Three of the six, Buenos Aires, Rosario

⁹ The total trade of the east coast was about \$1,379,400,000 in 1911; exports were about \$704,200,000; imports were about \$675,200,000. Total for Buenos Aires about \$436,000,000; for Santos about \$218,000,000; for Rio de Janeiro about \$130,000,000.

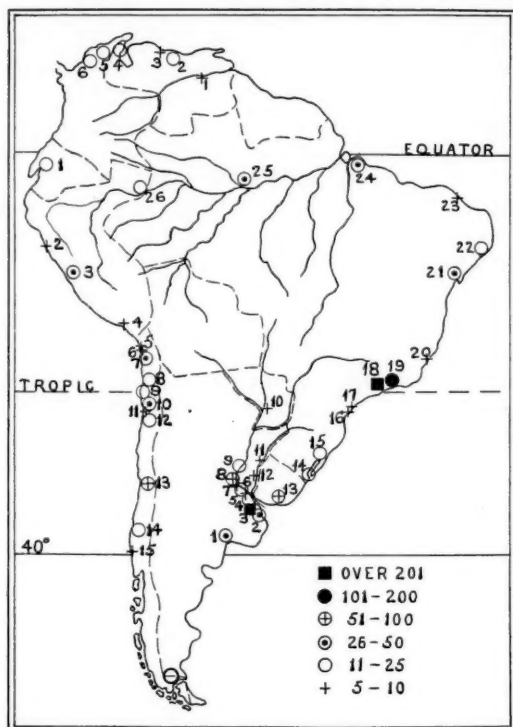


FIG. 3.—Map showing distribution of principal South American sea and river ports classed according to value of total trade in 1911. Values expressed in millions of dollars.

KEY TO NUMBERS.

North Coast Ports:

1. Ciudad Bolívar
2. La Guayra
3. Pto. Cabello
4. Maracaibo
5. Barranquilla
6. Cartagena

West Coast Ports:

1. Guayaquil
2. Salaverry
3. Callao
4. Mollendo

5. Pisagua
6. C. Buenas
7. Iquique
8. Tocopilla
9. Mejillones
10. Antofagasta
11. Coloso
12. Talcahuano
13. Valparaíso
14. Talcahuano
15. Valdivia

East Coast Ports:

1. Bahía Blanca

2. La Plata
3. Buenos Aires
4. Campana
5. Zárate
6. San Nicolás
7. V. Constitución
8. Rosario
9. Santa Fé
10. Asunción
11. Concordia
12. Colón
13. Montevideo
14. Río Grande do Sul.

15. Pto. Alegre
16. Paranaguá
17. Antonina
18. São Paulo (Santos)
19. Rio de Janeiro
20. Victoria
21. Bahía
22. Recife
23. Fortaleza
24. Belém
25. Manaus
26. Iquitos

N. B.—Iquitos (26) should lie farther up the Amazon, just below the confluence of the two source streams shown.

and Montevideo, approach a balanced traffic; La Plata and Santos are mainly exporting; while Rio de Janeiro is primarily an importing point.

This concentration of traffic on the east coast is the logical outcome of the relation of these two groups of ports to: (1) the chief producing regions for coffee and grains and animals respectively; (2) the most effective systems of internal transportation, the Brazilian railroads (centering on Rio de Janeiro and Santos), the Argentine railroads (centering on Buenos Aires) and the Rio de La Plata system of waterways; and (3) the largest groups and densest settlement of most advanced populations. Buenos Aires and Rio de Janeiro together receive more than 55 per cent. of all east coast imports, while Buenos Aires alone has an import trade (\$283,000,000 in 1911) nearly equal to the combined imports of all other east coast ports except Rio de Janeiro (32 in all) and representing more than 30 per cent. of the total for the continent. The leadership of Buenos Aires is due (1) to the fact that it is the largest local market, (2) it has the most favorable position with respect to groups of progressive population and (3) it has the best means of communication with a rapidly developing, extensive interior. Because these superior advantages are not likely to be rivaled by any other place, Buenos Aires bids fair to remain the chief commercial center of the continent.

(3) *Lack of concentration on west coast.* West coast trade, on the contrary, is not so concentrated. The "nitrate ports" of northern Chile (10 in number) handle more than 60 per cent. of the exports from the west coast, because nitrate alone makes up nearly half of all west coast exports and it, as well as various other products (borax, iodine and some metals), must be shipped from these ports. The "nitrate ports," however, receive only about 16 per cent. of the imports of the west coast, for they serve but a limited area and a relatively small population. In fact, except for Iquique and Antofagasta, the imports through the nitrate group are almost negligible.

Of the 18 important west coast ports, 10 are chiefly exporting, 4 are chiefly importing, and 4 have nearly balanced traffic. Of the exporting ports, 8 are in the nitrate group, and the other two serve the Peruvian sugar and cotton producing region. The most important of these exporting ports, Iquique, is outranked, in value of shipments (about \$23,000,000), by nine east coast ports and handles hardly more than 11 per cent. of the total for the west coast, while

on the east coast Buenos Aires and Santos each handle about 24 per cent. of the total for that coast. The importing ports, Valparaíso, Talcahuano, Coronel and Valdivia, serve central Chile, which is the most densely populated and economically the most advanced section on the west coast. It must be noted, also, that the surplus agricultural products of central Chile are shipped largely to the nitrate region and therefore do not figure in the foreign trade of the central Chilean ports. Two of the balanced traffic ports, Antofagasta and Mollendo, owe that condition largely to their handling of Bolivian trade, which the railroads have focused on these two ports, in addition to the traffic seeking them from Chile and Peru respectively. Callao, the third in this group, is the outlet for a rich section of central Peru, tapped by the Oroya railroad (notably the mining district of Cerro de Pasco), and also is the assembling and distributing point for the most important part of the Peruvian population. Guayaquil, the other balanced traffic port, dominates the only efficient routes into Ecuador and, therefore, handles nearly all outgoing and incoming trade. The separation of leading producing areas of exported wares from the largest consuming centers for imported goods and the absence of any extensive transportation system radiating from one port to serve important interior areas account for the lack of concentration of the west coast trade.

(4) *Contrasts in products exported.* The east coast ports are the outlets for extensive areas of rich agricultural, grazing and forest lands, but few of them are connected with areas known to be rich in minerals. They are, therefore, handling mainly exports of agricultural, pastoral and forest products (about 95 per cent.), in steadily increasing amount and variety (Fig. 4). This condition means, for the future, larger and denser populations, which are likely to have increasing purchasing power. West coast ports, on the other hand, are the outlets largely for arid or for rugged areas in which mineral deposits are of chief importance, because topography and climate make other resources relatively limited. They are, therefore, handling mainly exports of mineral products (about 70 per cent. of total shipments). Mining regions, as a rule, do not develop so large or so dense populations as are found in agricultural lands; they are less likely to attract the best immigrants, and the purchasing power of the people is likely to be relatively less because most mine workers are wage earners instead of independent producers. It is also probably true that a greatly increased output of most of the products handled from the east coast (coffee is the chief

exception) could find markets readily. It is not so certain that greatly increased output of several products handled from the west coast (as nitrate, copper, and borax) could find markets at all.

(5) *Contrasts in port equipment.* No west coast port has any real dock system, although Valparaiso will have docks eventually. The

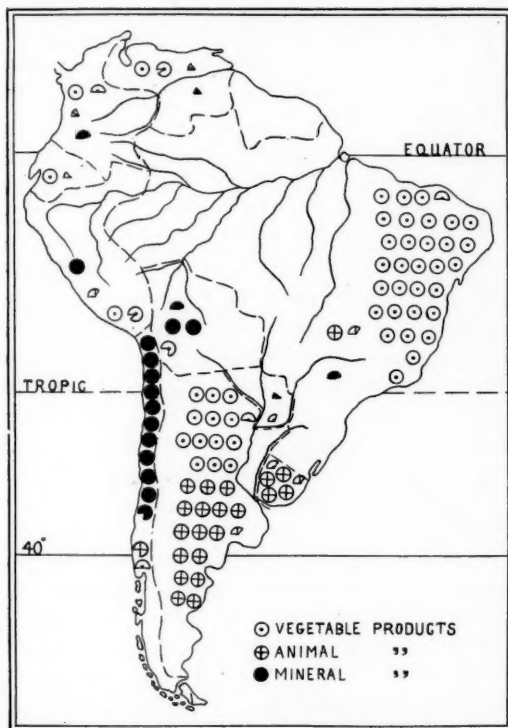


FIG. 4—Map showing distribution, by countries, of the three main classes of South American exports. Each circle equals \$10,000,000. Amounts of less than \$1,000,000 (animal products for Bolivia and for Ecuador; mineral products for Argentina, Uruguay, Paraguay and Ecuador) are not shown.

practice of lightering all cargoes is due largely to the following facts: (1) The "open roadstead" nature of most of the "harbors" makes the anchorage off shore the only safe procedure in the absence of artificial breakwaters. (2) The small value of commerce handled at most of the ports has hardly justified the investment of large

sums in costly port improvements. (3) Much *value* of exports may be handled, where minerals are the chief products, without much *bulk* being involved, and, therefore, lightering is not so inconvenient as would be the case in handling the great bulks of such commodities as grain and coffee. On the east coast, however, Belem (Pará), Rio de Janeiro, Santos, Montevideo, Buenos Aires, La Plata, Rosario, Santa Fe, and Bahia Blanca have or are building modern dock systems. More protected harbors, more value of commerce or greater bulk of goods to be handled account for the difference.

Chief countries traded with. More than nine-tenths of the foreign commerce of the South American republics is with countries outside the continent. The trade which is carried on among the republics (about 7 per cent. of the total) is mainly the exchange of products of the tropical sections for products of the temperate lands, as exchanging coffee, cacao, sugar, tobacco and fruits, for wheat and flour and meats. Traffic of this sort between Brazil and Argentina accounts for about two-thirds of the intra-continental trade, but in each case the trade with the neighbor is not more than 5 per cent. of the total for that country. For some countries the percentage is higher. Thus more than 70 per cent. of Paraguayan exports go to neighbors of that country (in part at least for reshipment) largely because of its inland position. Peru sends more than 20 per cent. of its exports to the other west coast countries (largely cane sugar to Chile) because of its ability to supply them with various tropical products from its irrigated coast islands. Bolivia secures more than 25 per cent. of its imports from its neighbors, because adequate supplies of various foodstuffs cannot be produced on the cold, dry, Bolivian highland. A relatively larger percentage of intra-continental trade would appear were it not that the northern countries, importing various foodstuffs, heretofore have found it more convenient to secure these from the United States than from temperate South America. Absence of regular service from temperate east coast ports to tropical north coast points has been the chief obstacle, but this obstacle is likely to disappear after the Panama Canal is opened.

Four countries, the United Kingdom, the United States, Germany and France, dominate South American trade, for they take more than 70 per cent. of the exports and supply more than 70 per cent. of the imports. Here again, however, there is a notable difference between the east and the west coast. About 87 per cent. of west coast

exports go to those four countries and 75 per cent. of west coast imports come from them. Much of the rest of the west coast trade is intra-continental. On the other hand, not more than two-thirds of the east coast exports and imports apply to the four countries named, and most of the rest of the east coast trade is not intra-continental. The wider range of trade from the east coast is due to (1) the character of its products, for varied products of farms, ranges and forests are in more general demand than the minerals shipped from the west coast; (2) its better location with respect to other commercial countries, which has favored the establishment of more lines of regular steamship service to a large number of countries;¹⁰ (3) the size and character of the population affected, for the larger number of European nationalities and the greater producing and consuming powers of this population attract more commercial enterprises. For these reasons also east coast trade has increased more rapidly than west coast trade, the struggle for east coast markets is keener, and there is more to win in those markets.

Importance of British trade. The United Kingdom has the largest share of South American trade, about 26 per cent., while the United States, with about 18, and Germany, with about 16 per cent., are well behind. One of the chief reasons for the leadership of the United Kingdom is the advantage of early start. For a good many years after the beginning of South American expansion, there was no serious competition with British manufactures, the open British markets were the best outlets for leading South American products, and with British vessels as the chief means of shipment, the course of trade logically was with the United Kingdom. Another influence working toward the same result is the large investment of British capital in the different countries. For example the most important railroads of Argentina have been built with British capital (about £200,000,000), and this fact naturally has led to a preference for British railroad material and equipment. Perhaps the most noteworthy fact in this connection is the leadership of British trade in the case of individual countries, for, with the exception of exports from Brazil, Venezuela and Colombia, where the United States stands first (largely due to the coffee trade), the United Kingdom is first (of the four countries noted) in both export and import trade. This general distribution and leadership of British com-

¹⁰ Buenos Aires, the leading east coast port, is served by some 30 regular lines (at least one vessel a month) plying to 18 countries outside of South America. Valparaiso, the leading west coast port, is served by 5 regular lines plying to 10 countries.

mercial activities is perhaps the best evidence of having been first on the ground.

Division of United States trade. United States trade is more concentrated than that of the United Kingdom, with the west coast relatively less important in the case of the former. Thus in exports to the United States the east coast supplies more than 80 per cent., while for the United Kingdom it supplies only about 65 per cent. of the total. In imports about 75 per cent. of the total from each of the two countries is taken by the east coast. The total trade of the United States with the east coast (about \$240,000,000) is nearly four times as valuable as that with the west coast. Better communication with the east coast is one factor, but the United States market for east coast shipments of coffee, rubber, and hides and skins is much better than for west coast minerals, and the development of east coast districts creates a greater demand for United States manufactures.

Exports to the United States. Many products are exported to the United States, most of them because the United States can not produce them as well or in amounts to satisfy domestic markets. The most important products sent to the United States are in order of value: coffee, rubber, hides and skins, nitrate, wool, copper (ore and metal), linseed, cacao, quebracho (extract and logs), sugar, brazil nuts, cotton, Panama hats and vegetable ivory. The combined value of these products makes up more than 96 per cent. of the exports to the United States (about \$192,000,000). The non-tropical commodities (hides and skins, nitrate, wool, copper, linseed) contribute nearly 40 per cent. of the total value of exports. Coffee and rubber, mainly from Brazil, contribute more than half the total; so that coffee and rubber plus the non-tropical products contribute more than 90 per cent. of the total exports to the United States. Since the United States has no tropical section, and South America is three-fourths tropical, it appears that the natural contrasts between the two regions have hardly begun to make themselves felt in commercial relations.

Imports from the United States. The imports to South America from the United States make a long list, mainly of manufactures, because the needs of South America are complex and comparatively little manufacturing is done on the continent. For example, in a list of 60 commodities imported from the United States, only four, wheat, coal, crude petroleum and leaf tobacco, are unmanufactured

wares; and the combined value of these (about \$1,820,000) was less than 2 per cent. of the total. The leading imports from the United States are iron and steel products, timber and lumber, petroleum products, and agricultural implements. These leading wares, however, make up less than 20 per cent. of the total, and only a few other wares contribute respectively more than 1 per cent. of the total. Iron and steel and petroleum products are well distributed, because the former are needed for nearly all sorts of internal expansion, and the latter (chiefly kerosene) can be had so readily from no other source. Most other wares from the United States are confined largely to a few markets. Thus agricultural implements and lumber go mainly to Argentina, the one because Argentina is the chief farming country, with conditions of cultivation similar to those in the United States, and the other because Argentina lacks accessible supplies of good structural timber. Crude petroleum goes mainly to the Chilean nitrate plants to be used as fuel. Wheat and wheat-flour go to Brazil and the other non-wheat-growing countries of northern South America. Similar limitations are to be noted in many other cases. For most of the manufactures, however, there is a much more general market than the imports from the United States suggest, again because of the lack of manufacturing on the continent. Hence it may be concluded that possibilities of expansion, along the lines already laid down, are limited mainly by the effects of competition from other important manufacturing countries.

Concentration of trade at United States ports. The Atlantic coast ports of the United States handle more than 80 per cent. of the exports from South America to the United States and more than 90 per cent. of the imports from the United States to South America. Pacific coast ports handle about 3 per cent. of the total trade, and the Gulf coast ports the rest. The chief shipments from the Gulf ports are cargoes of lumber from Pearl River and Pensacola for Argentine markets. The chief receipts at Gulf ports are cargoes of coffee at New Orleans from Brazil. Pacific coast shipments are mainly lumber, crude petroleum and wheat and wheat-flour sent almost solely to west coast markets (Chile and Peru chiefly). Pacific coast receipts are small, mainly ores to be smelted and nitrate from Chile.

New York dominates the Atlantic coast trade, having more than two-thirds of the total receipts from South America and nearly seven-eighths of the total shipments to South America. Boston and

Philadelphia receive wool, hides and skins, and tanning materials for nearby factories, but aside from these cases almost all the trade is concentrated on New York. The advantages of New York as a distributing center account largely for its leadership in the matter of imports from South America. Its relation to the manufacturing centers of the country, the fact that it was for a long time the terminus of the only regular liner traffic to South American ports, and the common practice among manufacturers of exporting through commission houses, many of which are located in New York, are the chief reasons for its striking leadership in the exports to South America. The changes in traffic arrangements after the opening of the Panama canal are likely to weaken this hold of New York on South American trade with the United States, by diverting a relatively greater share to the Gulf ports.

Conclusions. The foregoing discussion suggests certain conclusions. (1) South American commerce is capable of great expansion because of the vast vacant areas, with latent resources to provide for large increases in population. (2) The greatest commercial expansion is likely to be where natural conditions (topography, climate and resources) have been and continue to be most attractive to immigrants. (3) The area tributary to the east coast is by far the larger part of the continent, on account of the natural routes of communication. (4) This area tributary to the east coast is on the whole the more attractive to immigrants because of its greater accessibility, its agreeable climate over large parts, and its agricultural and pastoral possibilities. The east coast, therefore, will continue to be much the more important commercially. (5) The area tributary to the west coast is always likely to remain relatively small because the difficulties of crossing the Andine barrier will tend to turn the bulky products of the interior lowlands toward the cheaper water routes (or combined rail and water routes) to the east coast. (6) This western area is on the whole the less attractive to immigrants because of its ruggedness, aridity and greater limitations as relates to agricultural and pastoral pursuits. West coast trade may increase much, but can never rival east coast trade. (7) In expanding transportation systems to provide for further economic and commercial development, the systems serving the interior will be tributary largely to the east coast, for reasons already noted, and probably will converge on the two groups of ports now most important on that coast, because natural lines for penetrating the continent make those ports the logical inlets and outlets for the best part of the

interior. Incidental to this development, Paranaguá and Antonina are likely to become more important members of the southeast Brazilian group. (8) The equatorial section of South America will develop most slowly because of difficulties in the way of penetrating and populating it. For this reason, part of the chief commercial advantage of the continent, namely, development based on tropical products, will become effective but gradually. (9) The continent is not likely to become the scene of great manufacturing industries producing a surplus of wares for export, because of lack of fuel and power resources. On this account it should remain, at least for a very long time, primarily an exporter of raw materials and an importer of manufactured wares. (10) South American commerce always will be chiefly along north and south, instead of east and west, lines (a) in intra-continental trade between tropical and temperate sections, and (b) in extra-continental trade. Of the two branches the latter will continue to be the more important, because the sources of manufactures and the best markets for raw materials are in the northern hemisphere.

GEOGRAPHICAL INFLUENCES IN THE DEVELOPMENT OF WISCONSIN *

By MARY DOPP

Teacher of Physiography in the Francis W. Parker High School of Chicago

CHAPTER VII. DEVELOPMENT OF MANUFACTURING AND MANUFACTURING CITIES

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Manufacturing in Wisconsin has been marked in recent years by a growth both rapid and substantial. With few exceptions the products are made of native raw materials. The most important products are lumber, saw mill and planing mill products, woodenware, paper, wood pulp, agricultural implements and machinery, flour and grist mill products, malt liquors, cheese, butter, packed meats, leather, boots and shoes, brick and tile. The raw materials for iron and steel manufacture have to be imported, but the transportation facilities and the market make this a profitable undertaking. It is convenient to discuss the more important and characteristic industries in related groups rather than in order of commercial importance.

The extensive development of industries relying on timber products for raw material is to be expected in a state whose forests were so extensive and so valuable as those of Wisconsin. In the early days little lumber was cut except on those streams whose many rapids precluded the running of log rafts. Timber was run to market as logs and manufactured at such distributing points as Chicago, St. Louis, Davenport and other Mississippi River towns. After the railroad reduced the damage incident to transportation to a minimum, sorting and dressing of lumber was done more and more at the local mills. The large sawmills added secondary industries, and it is not an uncommon thing to be able to order from one concern everything of wood that goes into the construction of a building. In many places where logs are no longer available, rough lumber is imported and manufactured.

In 1890 there were 88 planing mills reported in the state; in 1900, 123; in 1905, 149. The value of the products in those years was \$6,295,000, \$8,400,000, and \$11,000,000 respectively. It is an interesting fact that in 1900 the town of Merrill, with a population of only about 9,000, had the largest output, valued at \$2,227,959.¹

The manufacture of paper, while originally not an adjunct of

¹ Wis. Bur. Lab. Stat., 1903-1904, p. 393.

the lumbering business, recently has become one of the most important associated industries. The first paper mill in Wisconsin was probably one erected at Milwaukee in 1846. In 1849 this mill employed 10 hands at a cost of \$40 a week. The output of 110 reams was sufficient to "supply the entire press of the state."² The business thrived for a time, but about 1875 was destroyed by flood and fire. Successful mills were built at Appleton in 1853 and at Whitewater in 1857. The Whitewater plant was bought by a large paper company in 1893 and now stands dismantled.

At Neenah paper making has been a thriving business for years. The first mill, erected in 1865-66, had a capacity of 2,500 to 3,000 pounds a day. The raw material was cotton rags, shipped chiefly from Milwaukee and Chicago. Between 1850 and 1875 paper mills were started at Waterford, Beloit, Sparta, and Fond du Lac.³ Before 1871 all paper made in Wisconsin was manufactured from cotton rags, white paper waste, or straw; that year the wood pulp process was introduced. At first poplar was used chiefly; now spruce is used very largely. The sulphite process of treating wood for pulp was introduced also first at Appleton, and was used with spruce. The same process was first used on hemlock at Kaukauma. The first tissue mills were erected at Kaukauma in 1885.

The invention of the stereotype cylinder press gave a great impetus to the wood pulp industry, for it made possible the use of dry paper for printing. The price of print paper fell from \$11 to \$1.20 per hundred pounds and the demand increased enormously. The accessibility of both wood and water power on the upper Wisconsin led to the extensive development there of the paper and wood pulp industry. The first mill was built at Centralia in 1886. At the present time there are mills at Conant's Rapids below Steven's Point, and at Grand Rapids, Nekoosa, Port Edwards, Wausaw, Rhinelander, Merrill, and Tomahawk. They all produce great amounts of ground wood or sulphite wood pulp. The two great paper and wood pulp producing areas are in the forest region where water power is abundant. In 1908 the Wisconsin mills used about 375,000 cords of wood, half of which was spruce and the rest hemlock.⁴ The spruce came largely from Minnesota and Canada, and the hemlock from Wisconsin. As the supply of hemlock within the state is limited, the question of the future source of pulp wood is a pertinent one. In 1910 101,702,000 feet of timber, spruce, pine,

² Lawson, P. V.: *Paper Making in Wisconsin*, *Wis. State Hist. Soc. Proc.*, 1909, p. 273.

³ Wisconsin in Three Centuries, Vol. IV, p. 58.

⁴ Lawson, *op. cit.*, p. 279.

and poplar, were made into ground wood pulp. Less than one-third of this was grown in the state. 208,591,000 feet of hemlock, spruce, and balsam were used to make pulp by the sulphite process, about half of which was grown in the state.⁵

In 1905 Wisconsin ranked fourth in capital invested and fifth in value of paper and pulp manufactured. In 1910 there were 57 establishments, having a combined capital of \$33,738,000, employing 7,467 hands, who received \$3,891,000 in wages. The total output was valued at \$25,962,000 and included every grade of paper from coarse wrapper to the finest bond.

Only three states produce more leather than Wisconsin, and the largest tanneries in the world are said to be located in Milwaukee. This is due to the forests and their large resource of hemlock bark. Some of the largest concerns began operations in New England and followed the supply of tan bark to Wisconsin.⁶

The number of hides tanned annually is over 2,000,000, and of calf skins there are about 3,500,000. One large tannery, located at Mellen on the Bad River, employs 1,000 men. It is estimated that there are 600,000 tons of hemlock bark accessible to this plant.⁶

Many varieties and grades of leather are produced. In 1906 the first glazed kid tannery built in the West was erected by a Milwaukee leather company.⁷ This is the only branch of the tanning business which requires the importation of all the raw materials from foreign countries.

Although the number of tanneries decreased from 42 in 1899 to 32 in 1909, the number of wage earners in the industry increased 43.4 per cent. and the value of products 122.5 per cent. The value of the products was \$44,668,000, which makes the leather industry the fourth in importance in the state.

The Indians ground corn and later wheat by means of a hand mill, which was really a mortar and pestle. The mortar was a log hollowed at one end, or a stone with a depression on one side. The pestle was of wood or stone and had a rounded head. The same method was followed by the French. It was not until about 1809 that power, other than human, was utilized in converting grain into meal or flour. The first grist mill that is recorded was built at Depere shortly after the first saw mill had been erected at the same power site. At Prairie du Chien, as has been noted, crude mills with granite stones were operated by horse power as early as 1816.

⁵ Smith, Franklin H.: *Wisconsin Wood-using Industries*, p. 33.

⁶ *Wisconsin in Three Centuries*, Vol. IV, p. 72.

⁷ Rep't Chamb. Comm. Milwaukee, 1906-1907, p. 51.

One of the first things the pioneer settlers did was to build a flour mill. It was run by water power and marked the center of the agricultural settlement which it served. In many cases it formed the nucleus of a thriving town. One of the first flour mills in the lead region was built at Gratiot in 1835. A grist mill determined the location of the village of Troy in 1837, of Geneva in 1838, and of Whitewater in 1839. A great advance was made in milling by the invention of the steel roller mill in 1874, by John Stevens of Neenah. The new process yielded 90 per cent. of high grade flour, as against 20 to 25 per cent. by the old buhr stone process. The capacity of the mills was increased greatly, and as high grade flour was worth \$2.00 a barrel more than low grade, the resulting profit was enormous.⁸ This invention made it possible to utilize the hard wheat of the north to much better advantage than before. The new milling system was introduced into Minneapolis in 1880 and shortly made that city the greatest flour manufacturing center in America.

Flour and grist mill products are among the most important in the state. The principal factors in the location of this industry are the raw materials, market, and water power. In some places the manufacture of flour has succeeded the manufacture of lumber, the grist mills utilizing the same power that once ran the saw mills. Many small mills are scattered through the agricultural districts and are engaged largely in grinding feed.

In 1900 Wisconsin's product was valued at \$23,700,874 and in 1909 at \$31,667,000. Milwaukee had an output in the latter year valued at \$8,000,000.

The manufacture of malt liquors is associated with the raising of grain and is one of Wisconsin's most noted industries. The first brewery in Milwaukee, and doubtless the first one in the state, was built in 1840. The first brew was made in July of that year from 130 bushels of barley brought in a sloop across the lake from Michigan City.⁹ The original brew-kettle, a copper-lined wooden box, was replaced in 1844 by a copper kettle of Milwaukee manufacture. The capacity of the brewery was thus increased greatly. Several of the principal existing brewing plants were established in the 1840's. The Best Brewing Company was organized in 1842, the Blatz in 1846, and the Schlitz in 1849. In 1856 there were 26 breweries, producing \$750,000 worth of ale and beer.¹⁰ In 1870 Mil-

⁸ Lawson, P. V.: *The Invention of the Roller Flour Mill*, *Wis. State Hist. Soc. Proc.*, 1907, p. 251.

⁹ *Wisconsin in Three Centuries*, Vol. IV, p. 66.

¹⁰ *Hunt's Merchants' Magazine*, Vol. 41, p. 310.

waukee produced 108,845 barrels of beer; in 1880, 762,220 barrels; in 1900, 2,500,000 barrels; and in 1907, 3,828,484.¹¹ The last figure is the highest mark yet reached by the malt liquor industry. In 1909 the output decreased to 3,212,911 barrels, which is less than for any year since 1904. While the production for 1907 is considered an abnormal one, the decrease for 1908 and 1909 seems to represent more than the natural reaction. The decrease in the output is due apparently to a decrease in consumption caused by the adoption of prohibition in certain states.¹² Some of the Milwaukee breweries had a large trade in Alabama, Georgia, Mississippi, and Louisiana. Prohibition in these states probably has reduced the demand for malt liquors more than any other cause. In 1910 the production was again high, being 3,724,937 barrels. In 1909 the value of malt liquors produced in the state was \$32,126,000. For Milwaukee it was \$19,643,000. Of the smaller cities La Crosse is the largest producer, with an output in 1906 valued at \$2,217,503.

As indicated in the discussion of agriculture, dairy products were very limited for a long time after the settlement of the state by farmers. In 1850 the counties reported as producing the greatest amount of dairy products were Rock, Walworth, and Waukesha. The total butter output for the three counties was considerably less than half, and the cheese output less than one-third that of Waukesha County alone in 1905. At that time each farm had its dairy, which manufactured cheese and butter from a single herd. In the report of the Secretary of the Wisconsin State Agricultural Society for 1868, the recent introduction and rapid development of the factory system of making cheese is noted. At that time there were nearly 50 such factories, "many of them consuming the milk of 200 to 400 cows, and at least one (the Rosendale factory), of 600 cows." The same report says: "Hitherto, for some reason, but little attention has been given by these cheese-making companies to the manufacture of butter, an article certainly no less susceptible of successful and profitable manufacture under the cooperative or general factory system than cheese, and one the necessity for improvement in the quality of which is universally felt." That butter was not manufactured extensively is not so surprising. Milk was sold by the gallon and quality was not recognized in a commercial way. It was not until after the invention of the cream separator and the Babcock milk tester that butter could be made profitably outside the dairy.

¹¹ Rep't Chamb. Comm. Milwaukee, 1908-1909.

¹² *Ibid.*, p. 61.

The manufacture of foreign cheese, which has developed so extensively, had its beginnings in the foreign colonies which early settled in the state. The Wisconsin Swiss cheese was made first in Green and the neighboring counties in the southern part of the state. The people of these colonies had been bred to the dairy business among the mountains of Switzerland, and when they located in the blue grass region of Wisconsin they were admirably situated to continue the occupation. The first cheeses were not larger than a saucer and could be held in a child's hand.¹³ Until 1870 there were no factories making Swiss cheese. In that year two were built, with the result that the home manufacture of cheese was given up rapidly for the more profitable factory method. The early cheese makers were Swiss and most of them were foreign born and trained. While this branch of the industry started among the Swiss, people of other nationalities living in the district have become interested in it and contribute to its advancement.

Wisconsin Swiss cheese is acknowledged to be the equal of that made in Switzerland. This is due not more to the fact that the Swiss manufacture it, than to the conditions of climate and soil, which give the water and crops necessary to the production of a good quality of milk. The climatic conditions are favorable, also, to the successful manufacture and preservation of dairy products.

The state is divided into several sections by the dairy and cheese industry (Fig. 33). There is the Swiss cheese region of Green and surrounding counties, where Limburger cheese is also made; two Cheddar cheese regions, one in Richland County and the other in the counties near Lake Michigan; and the brick cheese area of Dodge County. The area of greatest butter production begins at Rock and Walworth Counties and includes Dane and Jefferson. This peculiar segregation of the different phases of the industry is due to nothing more vital, apparently, than the previous training of the people who support the industry. There is a dairy region of rapidly growing importance in central Wisconsin including the counties of Shawano, Oconto, Waupaca, Portage, Wood, Marathon, Clark, Eau Claire, Chippewa, and Barron. It is very probable that as the northern part of the state opens up the dairy industry will thrive even better than in what are now the largest producing counties. The basis for such a supposition is the fact that the cool nights of the summer months, and the nutritious grasses of the "grassland"

¹³ Luchsinger, John: *The History of a Great Industry, Wis. State Hist. Soc. Proc.*, 1898-1899, p. 228.

region of the state all contribute to make this an ideal dairy and cheese section.¹⁴

In 1905, Green County, the center of the Swiss cheese region, realized \$1,088,741 from its factories; Dodge County, the center of the brick cheese area, received \$1,236,487; Sheboygan, the largest

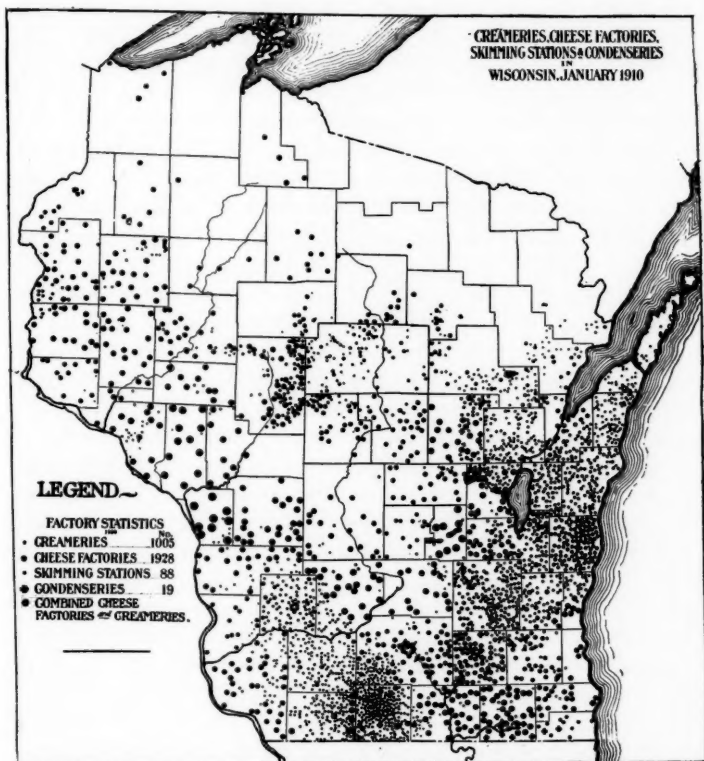


FIG. 33—Creameries, Cheese Factories, Skimming Stations and Condenseries in Wisconsin, January 1910. Scale, 1:4,600,000.

producer of Cheddar cheese, received \$1,111,583. These were the only counties receiving more than \$1,000,000 from the cheese factories. In the same year Walworth County sold butter to the value of \$1,977,090; Jefferson, \$1,368,530, and Dane, \$1,202,038. In 1909, 105,307,357 pounds of butter were produced in the state,

¹⁴ Wis. Bur. Lab. Stat., 1905-1906, p. 381.

which is an increase of nearly 20 per cent. above the product of 1905. The amount of cheese manufactured was 145,171,035 pounds, —more than 32 per cent. greater than the output in 1905.

The business of slaughtering and meat packing has assumed considerable proportions in Wisconsin, because of the large amount of stock raised, the cool climate, and the cheap transportation to the eastern market. Where there is an abundance of cheap ice and good packing and transportation facilities, the shorter the distance live-stock is moved to a packing center, the greater the profit.

In the decade between 1890 and 1900 there was considerable concentration of the industry. This is made apparent by a decrease of one-half in the number of establishments and an increase of one-third in the output. In 1900 Wisconsin ranked seventh among the states, with a product valued at \$13,601,125. Of this amount Milwaukee and Cudahy together produced 94.2 per cent. In 1905 the total value was \$16,569,423, 37.5 per cent. of which belonged to Milwaukee. In 1909 the total value for the state was \$27,217,000.

The converting of ore into pig iron was begun at Mayville before 1856, but the development of the industry was slow until after the erection of the mills of the Milwaukee Iron Company at Bay View in 1868.¹⁵ The advantages offered by Bay View were several. Land was cheap, and, being outside the city limits of Milwaukee, taxes were low. At the same time the location was near enough to derive the benefits offered by Milwaukee as a large distributing center. There was also the advantage of water and rail transportation. In March, 1868, the first bar of iron rolled in Wisconsin was made at Bay View. At first the mill re-rolled old rails, but presently it made iron directly from the ore which came from Iron Ridge, and from the Lake Superior Mines. In 1880 the 3 mills at Milwaukee and Bay View were the only ones out of the 14 in the state that used coke and coal instead of charcoal for converting ore.¹⁶ At first the fuel was imported from Pennsylvania by way of the lakes. Later, some of it was shipped from Illinois. In 1869 the Bay View concern employed 300 men, of whom only 22 were Americans. A large proportion of the skilled labor came from England and Wales. These men were experts trained in the iron works of Great Britain.¹⁷ At that time the plant had a capacity of 25,000 tons of finished rails per annum.¹⁸

The manufacture of iron is carried on most extensively in the

¹⁵ *Trans. Wis. State Agric. Soc.*, 1869, p. 48.

¹⁷ *Trans. Wis. State Agric. Soc.*, 1869, p. 52.

¹⁶ *Geology of Wisconsin*, Vol. I, p. 614.

¹⁸ *Ibid.*, p. 49.

counties of Milwaukee, Racine, and Rock. There are three blast furnaces in the state—one at Ashland, which uses Penokee-Gogebic ore, one at Mayville, which uses Dodge County ore, and the third at Bay View, which uses both Dodge County and Lake Superior ore. In 1905 there were 14 establishments manufacturing iron and steel. 2,397 men find employment in these works and produce \$10,453,750 worth of material. The combined output of the iron and steel manufactories and of the foundry and machine shops was valued at \$40,361,751, of which Milwaukee produced 42.7 per cent. In 1909 the total value for the state was \$65,057,000.

The chief manufacturing cities of the state are Milwaukee, Superior, Racine, Oshkosh, La Crosse, and Sheboygan. Milwaukee, located where Milwaukee River empties into a crescent-shaped bay, is acknowledged to have the best natural harbor on the west side of Lake Michigan. The first settlement, other than that connected with the fur trade, was in 1834, and growth has been rapid and constant. For years there was great rivalry between the lake ports, and it was uncertain whether Wisconsin's metropolis would be at Racine, Milwaukee, or Green Bay. For a long time Green Bay was the popular favorite, and the newspapers of that city were full of sarcastic comments on the pretensions of the village of Milwaukee. The advantages of the Lake Michigan ports, exclusive of Green Bay, were much the same. Milwaukee had the advantage of an early start; it was located centrally with regard to the agricultural area, and these two things, combined with its harbor facilities, gave it a permanent lead.

The industries which now represent the greatest proportion of the wealth of the city were, most of them, started early. The flour mill and brewery industries were established first. The first tannery was started in 1842.¹⁹ In 1843 a foundry and a woolen mill were erected.²⁰ The same year the first pier was built to accommodate shipping. In 1847 a steam flouring mill was built and two years later an iron foundry and locomotive works. The first locomotive built in the state was in this shop.²¹

In 1854 the manufactures of Milwaukee had an estimated value of \$4,600,000, and in 1856, of \$8,000,000. In the latter year the iron manufactures amounted to \$1,500,000; the malt liquors to \$750,000; distilled liquors, \$500,000; flour, \$700,000; slaughtering and meat packing, \$400,000; tanning and wool pulling, \$280,000; boots and

¹⁹ Buck, J. S.: *Pioneer History of Milwaukee*, Vol. II, p. 147.

²⁰ *Ibid.*, p. 156.

²¹ *Ibid.*, p. 180.

shoes, \$350,000; brick, \$350,000.²² It is to the many buildings made of this cream-colored brick that Milwaukee owes its name of the "Cream City."

In 1909 the total value of manufactures was \$208,324,000, an increase of 51 per cent. since 1904. This gives Milwaukee tenth place among the manufacturing cities of the United States. The number of wage earners employed in manufacturing was 59,502, an increase of 37 per cent. since 1904. Milwaukee reported 35.3 per cent. of the total value of manufactured products for the state in 1909, and employed 32.6 per cent. of the total number of wage earners. More than one-third of the total value of the foundry and machine-shop products of the state; about three-fifths of the value of products for the leather, brewery, and printing and publishing industries; nine-tenths of that for the fur-goods and the paint and varnish industries; and the entire output of the millinery and lace-goods industry were reported from Milwaukee. According to the Bureau of the Census the value of the products for the steel works and rolling mills in the state was mostly reported from Milwaukee, but the statistics for the industry for the city can not be shown without disclosing individual operations. In 1909 Milwaukee held first place among the cities of the United States in the value of leather tanned, curried, and finished, and third place in that of malt liquors brewed.

In addition to being by far the most important manufacturing city in the state, Milwaukee is also the commercial metropolis. On August 27, 1859, two steamers, newly launched at Buffalo, the *Detroit* and *Milwaukee*, arrived to enter the lake trade between Milwaukee and Grand Haven on the Detroit and Milwaukee Railway system. This marked an epoch in Milwaukee's lake trade, as they were the first boats to run on regular schedule out of the city. In 1910 the lake commerce included 5,790 arrivals with a tonnage of 8,559,023, and 5,683 clearances, with a tonnage of 8,426,731. The total receipts of grain were 47,204,573 bushels, of which 10,173,690 bushels were wheat; 8,074,950, corn; 13,097,150, oats; 14,908,693, barley; and 534,073, rye. The receipts of flour were 3,124,853 barrels and the shipments were 3,705,384. 5,588,683 tons of coal were imported.²³

One of the main elements in Milwaukee's success as a commercial city is the harbor. Over \$2,000,000 have been expended already on the harbor improvements, three-fourths of which has been furnished

²² *Hunt's Merchants' Magazine*, Vol. 41, p. 139.

²³ *Milwaukee Sentinel*, Jan. 1, 1911.

by the federal government.²⁴ Over \$1,000,000 was spent in building a harbor of refuge. Improvements now going on involve the construction of the outer breakwater by the federal government. Plans for the extensive improvement of the harbor, including the utilization of Jones Island, have been developed recently. Isham Randolph, expert engineer of Chicago, prepared the plans and is quoted as saying that "there is on the west shore of Lake Michigan no really commodious and ample harbor suited to the requirements of our modern lake freighters, and no city on that shore can so easily and so cheaply provide a harbor which will invite commerce as can Milwaukee." The plans would require the ultimate expenditure of \$4,606,569. The designs cover vast docks and piers, and a municipal belt line railroad which would afford direct communication with water transportation facilities. It would also allow other railroads to enter the city besides the ones now operating there. The cost would fall upon the city, the railroad companies in the building of their own docks, and the federal government. The city's share in the expense would be about half the estimated cost. Should such extensive harbor improvements be carried out, the growth of the city in population, manufactures, and commerce would no doubt make it a profitable investment.

La Crosse, located on the Mississippi River at the mouth of the La Crosse, and a few miles below the mouth of the Black, has several advantages of position. It was supported by the lumber business, which developed at the mouth of these rivers, which flowed through the pine and hardwood forests. It has the benefit of river transportation and its effect on freight rates. It has excellent railroad facilities and was called the "Gateway City" when the Chicago, Milwaukee, and St. Paul Railroad crossed the Mississippi at this point on its way west. La Crosse also has the support of a rich agricultural region.

In 1853 the town contained 10 saw mills, 3 shingle mills, 1 sash and blind factory, and an iron foundry.²⁵ In 1874 there were 3 large saw mills and several smaller ones, 1 sash, door and blind factory, 7 factories making farming implements, including threshing machines, 3 foundries, as well as several other industries of importance.²⁶ For years lumber products of various kinds were the chief manufactures, and the total value of manufactures naturally

²⁴ Rep't Chamb. Comm. Milwaukee, 1903-1904, p. 61.

²⁵ Ritchie, J. S.: *Wisconsin and Its Resources*, p. 118.

²⁶ Tuttle, C. R.: *History of Wisconsin*, p. 76.

diminished with the decline of the lumber business. In recent years there has been increasing diversification and growth of manufactures outside of the lumber industry. Between 1900 and 1905 the value of agricultural implements increased 47.4 per cent.; carriages and wagons, 53.3 per cent.; flour and grist mill products, 79.1 per cent.; malt liquors, 27 per cent. In 1905 La Crosse manufactured about 20 per cent. of the state's confectionery product, valued at \$475,000. In 1909 the total value of manufactured products was \$14,103,000, an increase of 73 per cent. in 5 years.

Oshkosh is located on Lake Winnebago at the mouth of the Wolf River. The Wolf ran through a heavily wooded area of excellent timber and early became an important lumbering stream. The bulk of this timber was brought to Oshkosh and made that city above all a manufacturer of forest products. In 1855 Oshkosh contained 14 saw mills manufacturing 25,000,000 feet of lumber.²⁷ It contained also steam shingle and grist mills. Oshkosh has been called the "Sawdust City" because of the many acres of low land and marsh land along the river front that were filled in and reclaimed with sawdust. Many of the streets in the saw mill district were paved with sawdust. This inflammable material was often the cause of fires which lasted for days and even weeks.²⁸ Between 1890 and 1900 the value of manufactured products represented an increase of only 1.9 per cent. In spite of the small total increase this indicates an improvement in the general industrial conditions and a growth in new lines, as there was a heavy loss in lumber and timber products. Between 1900 and 1905 Oshkosh gained less than 1 per cent., but the planing mill products had increased 51 per cent. In 1909 the value of all manufactured products was \$14,739,000, an increase of 70 per cent. since 1904.

Racine, at the mouth of the Root River, was settled in 1843. It was said by its supporters to have "one of the best, if not the very best harbor on the western shore of the lake,"²⁹ and one that was large enough to "accommodate the entire shipping of the lakes." In 1853 it had 3 flouring mills, one of which was run by steam. From the town three roads were being built into the interior of the state—one west to Burlington, Elkhorn, and Delavan, one southwest to Wilmot, and a third northwest. In the 1860's the manufacture of wagons and agricultural implements, including threshing machines, became well established and along this line Racine's manufacturing indus-

²⁷ Ritchie, *op. cit.*, p. 119.

²⁸ Wisconsin in Three Centuries, Vol. IV, p. 36.

²⁹ Hunt's Wisconsin Gazetteer, 1853, p. 183.

tries have concentrated. Not having been dependent upon the pine forest for raw materials, the manufacturing interests did not suffer with the decline of lumbering. Having access to hardwood forests for supplies and to the great agricultural region at the west for a market, Racine's growth along industrial lines has been steady and rapid. In 1905 the more important industries ranked according to the value of products as follows: agricultural implements, first; carriages and wagons and automobiles, second; foundry and machine shop products, third; and patent medicines, with a value of \$665,810, fourth. In 1909 the total value of manufactures was \$24,673,000, an increase of 50 per cent. over 1904.

Sheboygan is another Lake Michigan port, at the mouth of Sheboygan River. Because it had not attained the size of 20,000 until after 1890 its manufactures were not reported separately in the federal census until 1900 and comparisons cannot be made before that date. Sheboygan is known as the "Chair City" from the fact that some 10,000 chairs are made there daily. A reputation for chairs was established in the 1860's, when the city's population was less than 3,000. In 1900 nearly one-half of the \$7,469,202 worth of manufactures was factory-made furniture. In 1905 it constituted 38 per cent. of the \$10,086,648 product. In 1909 the total value of manufactures was \$11,290,000, a gain of 17 per cent. since 1904.

Superior is located at the mouths of the St. Louis and Nemadji Rivers and has, with Duluth, the best harbor on the Upper Lakes. Very early much was prophesied for the town, and about 1850 a typical frontier boom was started. The town was laid out in 1853. In 1856 it had 4 saw mills and a total of 190 buildings. In 1857 the business houses alone numbered 340.³⁰ There was no substantial basis for growth and development until after the Northern Pacific Railroad reached the place early in the 1860's. Then the town grew with wonderful rapidity. In 1905 the state census reported a population of 36,551, and in 1909 it was 40,384. In 1905 flour and grist mill products constituted 56.9 per cent. of the total manufactures of Superior. Next in value came foundry and machine shop products, while lumber and timber products were valued at only \$85,788. A readjustment is evidently going on in Superior. The industries which rely on the forests for raw materials are decreasing. Those dependent on the materials furnished by the agricultural hinterland and upon cheap water transportation are increasing. The value of manufactures in 1909 was \$6,574,000, a slight increase over 1904.

³⁰ Ritchie, *op. cit.*, p. 235.

The towns of Wisconsin do not differ materially from one another in industrial conditions. The fact that a particular town is noted for a special industry rather than any neighboring town depends often on no more important factors than an earlier start or more efficient management. In the Fox River valley, Appleton, Neenah, and Depere are noted for paper and wood pulp manufacture. Green Bay has several thriving industries, the most important being lumber and planing mill products. Menasha is known as the "Woodenware City." Fond du Lac has large tanning interests, and Berlin produces much flour and feed. Toward the south, Beaver Dam has large iron works which reflect the proximity of the Dodge County iron mines. Beloit has a large output of machinery and pumps. Janesville produces agricultural implements and barbed wire. Kenosha and Port Washington make furniture and beds. Madison and Stoughton make a specialty of agricultural implements, and carriages and wagons. Sparta manufactures cigars and tobacco. In the upper Wisconsin valley Steven's Point and Grand Rapids make large quantities of paper and wood pulp, and most of the towns in the forest area still manufacture considerable quantities of saw mill and planing mill products, as well as other secondary forest products.

Manufactures are scattered rather widely, but by no means evenly, over the state. This fact is apparent from Figure 34, which represents graphically each county's relative contribution in 1900 to the total manufactures of the state.

Milwaukee County produces 38.87 per cent. of the manufactures for the state. The counties bordering on the Lakes, including those on Green Bay, show relatively high percentage of products. All of the lake counties, exclusive of Milwaukee, furnish 23.15 per cent., and including Milwaukee, 62.03 per cent. If to the 15 lake counties be added the 4 counties along the lower Fox having easy water communication with the lakes, then the total amount of their manufactures is 70.59 per cent.

The controlling factors, in the case of the lake counties, seem to be the abundance of raw materials and the proximity to market, the market being easily accessible by water. The raw materials are forest products, grain, live stock, iron, and coal. While iron and coal do not occur in any of the lake counties, their location gives them easy access to Lake Superior iron and to coal from the East or from Illinois. In addition, the counties along the lower Fox have the advantage of abundant water power.

Two groups of counties with important manufacturing interests, one along the upper Wisconsin and the other along the upper Chippewa, are in the midst of the forest region and in the crystalline rock area, where water power is abundant. The forests furnish the raw materials, and the logs are carried on the rivers to the saw

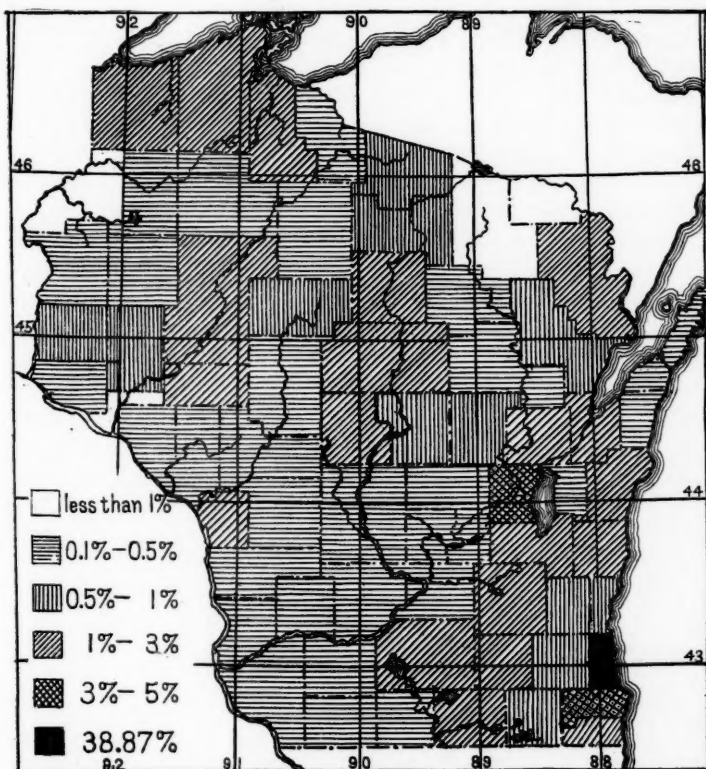


FIG. 34.—Percentage of Total Manufacturers in Each County in 1899. Scale, 1:4,500,000.

mill towns, almost all of which are located at water power sites. The same conditions hold for St. Croix and Dunn Counties, but the amount of the product is smaller. La Crosse County shows the influence of the same factors, added to which is that of unusually good railroad service.

A group of counties in the south-central part of the state, con-

sisting of Dane, Dodge, Jefferson, and Rock, produce 7.5 per cent. of the state's manufactures. A large part of this is in agricultural implements, machinery, carriages and wagons, paper, flour and feed, and malt liquors, for which the raw materials as well as the markets are near at hand. In general, then, the two most important factors locating manufactures in Wisconsin are raw materials and markets. Water power, which has been in the past a very important element in the problem of manufacturing, will, without doubt, be equally important in the future.

Nothing demonstrates more clearly the transition of the state from an agricultural to a manufacturing community than the concentration of population in cities. Of a population of 2,333,860 in 1909, 43 per cent. live in the cities. There are nine cities with a population of over 20,000. These are Milwaukee, Superior, Racine, Oshkosh, La Crosse, Madison, Sheboygan, Green Bay, and Kenosha. Their combined population is over 600,000. The eighteen cities having a population of over 10,000 contain one-third of the total population. There are eighty-four cities which have more than 2,000 inhabitants each.

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GEOGRAPHICAL VISUALIZATION

To the January, 1913, number of the *Geographische Zeitschrift* (pp. 35-39) Professor Hettner contributes a suggestive paper with the above title. In it he analyzes the nature of visualization and then deduces from this analysis the proper principles of geographical instruction.

Visualization, he says, is of two kinds: sensual and mental. The one is gained directly through the senses, the other through the coordination of concepts in the mind. After long neglect, pedagogy in general and geographical teaching in particular are at present emphasizing the method of direct appeal to the senses. This is as it should be. Geographical excursions should form an integral part of all geographical instruction, whether elementary or advanced, and free use should be made of photographs, lantern slides, etc., as illustrative material.

However, it must not be overlooked that visual instruction has its limitations—limitations of a diverse nature. These may be either spacial, temporal, objective or subjective.

The limitation of space is due to our restricted field of vision, which allows us to see only a very limited region at a time. Even when we receive a succession of images, as on a railroad journey, they do not resolve themselves into a complete picture. In fact, experience has shown that our recollection of a region through which we have traveled is made up of a series of individual images which do not form a homogeneous whole.

The limitation of time is based on the fact that all visualization through the senses is dependent on a concrete impression. Geographically this is important, as the appearance of a region we see before us depends on the state of the sky and the light conditions resulting therefrom. These govern our impression; but they are temporary factors only, and geography is interested not in the single moment but in the whole span of time. He who lives in a certain region and is a close observer of nature may carry with him a great many images which, together, will form a unit. He who sees a region but once while traveling through it must be able to make allowances for its momentary appearance—which may be exceptional—in order to visualize it in its true geographical aspect.

The objective limitation is due to the inherent nature of geo-

graphical phenomena. Thus, a great number of phenomena, such as the climatic elements—with the exception of nebulosity,—the physical and chemical conditions of water, to a certain extent also the composition of the earth's rock mantle, cannot be grasped directly through the medium of the eye.

The last limitation is that of our subjectivity. With the exception of such synthetic geniuses as were Leonardo da Vinci and Goethe, we are only to a limited extent capable of changing the impressions we receive from the outer world into vivid conceptions, and, to a still less extent, of retaining these conceptions in our memory. Geographical instruction, therefore, which is based only on the appeal to the senses, would, for the great majority, prove inadequate.

For the various reasons enumerated sensual visualization must be supplemented by mental visualization. Mental visualization can be attained through the coordination of concepts which have been gained either by direct observation or by reading or by oral instruction. This form of visualization, therefore, presupposes a conceptual analysis of nature; its function is a synthesis of the facts thus derived. Thus, in geography, the relevant procedure consists, on the one hand, of uniting into a homogeneous whole the facts furnished by diverse sciences with regard to a certain individual locality, or, on the other hand, of investigating the relations of different localities, and grouping them into regional units. Two mental images of a region may, therefore, be obtained. The one, gained from direct personal observation, is vivid but often does not make for a clear conception of its general relationship. The portrayal of this image requires a vivid and imaginative style. The other, of paler colors and less variety of form, is simpler and more schematic, but for that reason more synoptical, clearer, more definite. It requires a precise and sober style.

The tendency to outer or to inner visualization will vary with the individual. It will depend upon the opportunities he has had for travel, for studying geographical pictures and the use he has made of these opportunities. But, more especially, it will depend upon his temperament, *i. e.* on the greater development of the faculty for direct observation and retention or for the elaboration of complicated processes of thought, as the case may be. Both mentalities may well lay claim to geographical culture, and it would be unjust to value more highly the one or the other or the geographical culture based upon it. But he who aspires to geographical cul-

ture must make use of one or the other of the two methods. He who cannot visualize geographically, he whose geographical knowledge is only limited to facts and processes, will never make a good geographer nor will he be able to apply his knowledge fruitfully.

We thus see that the most important function of geographical teaching is to convey a vivid image of the countries and regions of the world. If it fails to do so it is not worthy of the name. The change from word geography to map geography, the substitution of a thorough comprehension of the geographical ground plan for a knowledge of geographical names only, represented a great step in advance. But the ground plan alone is only the outer form, the shell, as it were, which is devoid of importance and educational value unless it be supplemented by the power to visualize the regions and countries of the world. A number of modern teachers have clearly recognized this to be the object of geographical instruction. To this goal two paths lead, and not one or the other but *both* must be followed to insure attainment, partly because they supplement each other, partly because, according to their respective temperaments, pupils will prefer either one or the other and will reach the goal most easily by the method most suited to them. The introduction into the schools of geographical excursions and the use of pictures in teaching represented a great advance pedagogically, for the pupil should always be taught to observe nature at first hand. But direct sensual visualization will profit the majority little and some practically none, if it is not supplemented by mental visualization, which is based on the synthesis of facts seen, heard or read. Description may stimulate mental visualization to a certain extent, specifically, in pointing out similarities with known regions. But this form of visualization can attain its highest development only by means of the principle of causality, *i. e.* when it is based on a clear conception of the causal relations involved. A great number of geographical causal relations are familiar even to the child and still more so to the growing boy or girl, and the recognition that one fact depends upon another or is caused by it, and that the character of the regions of the world is due not to a chance hodgepodge of phenomena but represents an orderly and harmonious whole, cannot but enrich and mature the youthful mind.

W. L. G. J.

GEOGRAPHICAL RECORD

THE AMERICAN GEOGRAPHICAL SOCIETY

Exhibition of Karakoram and Ruwenzori Photographs. With the kind cooperation of the Appalachian Mountain Club of Boston, our Society opened at its house on October 25 an exhibition of the Club's collection of Vittorio Sella's superb panoramas and other photographs of the Karakoram Mountains in the Himalayas and of the Ruwenzori Range in Central Equatorial Africa. Many of these views are tele-photographic and especially appeal not only to lovers of the grandest mountain scenery, but also to geographers, geologists and glaciologists. Sharply defined details of mountain structure and denudation, of glaciers and their work, of moraines, glacial streams, and of all other phenomena of high mountain regions make these remarkable photographs especially worthy of study and the opportunity has been improved by teachers and students. The attendance has been gratifying. As this Bulletin goes to press the exhibition is still open and may not close till the end of the year.

Exhibition of Maps, Photographs, etc. Specimens from the Society's collection of maps of Central and South America, Spanish and Portuguese Africa and Portuguese India will be exhibited for the next few months simultaneously with exhibitions of photographs, books, etc., relating to these countries and regions which will be shown at the house of the Hispanic Society of America. The maps are being shown in the exhibition room of our Society in the following order:

November 8th, Argentina; 15th, Bolivia; 22nd, Brazil; 29th, Chile.

December 6th, Colombia; 13th, Costa Rica; 20th, Cuba; 27th, Guatemala.

January 3rd, Honduras; 10th, Mexico; 17th, Nicaragua; 24th, Panama; 31st, Paraguay.

February 7th, Peru; 14th, Philippines; 21st, Porto Rico; 28th, San Salvador.

March 7th, Santo Domingo; 14th, Uruguay; 21st, Venezuela; 28th, Portuguese Islands.

April 4th, Spanish Islands; 11th, Portuguese Africa; 18th, Spanish Africa; 25th, Portuguese India (Damaun and Goa).

The maps will be as diversified as the Society's advanced collections allow. Physical and economic features will be strongly represented. It is also planned to show the progress of cartography in each of these countries by arranging the displays in chronological sequence. The exhibit is open to the public daily between 10 A. M. and 5 P. M. and on Sunday afternoons between 2 and 5 P. M.

NORTH AMERICA

The Fate of Harry V. Radford and T. George Street. There seems no longer reason to doubt the report that Mr. Radford, the naturalist, and a member of this Society, and his companion, Mr. Street of Ottawa, were killed by Eskimos at Bathurst Inlet, northern Canada on or about June 5, 1912. Our Society recently received a letter from Mr. Radford dated June 5, 1912, the day on which, according to the newspaper reports, the tragedy occurred. This coincidence and the further fact that the arrival of Radford at Herschel Island was reported later encouraged the hope that the story of the murder of these men was not true. Our Society, however, has been informed by Mr. S. Fortescue, Comptroller of the Royal Northwest Mounted Police, that Radford and Street had not arrived at Herschel Island up to August this year; and the report received in Ottawa from W. C. Edgerton, sergeant in the Royal Northwest Mounted Police, Hudson Bay District, under date of May 21, 1913, though based entirely upon the testimony of natives, seems conclusive as to the substantial accuracy of the story of the murder. The two men appear to have been killed by Eskimos at Bathurst Inlet as the result of a quarrel.

Mr. Radford, using his own resources, left this city in February, 1909, to study the wood bison and other large fauna in the Canadian Northwest. In December, 1910, on the way to Fort Smith, he passed through the wood bison habitat and collected data concerning that animal. In 1911 he made maps showing his explorations to the east and west of the Slave River which he sent to the Interior Department of Canada; and he spoke of discoveries he had made and of zoological and botanical collections which he had forwarded to the U. S. Biological Survey at Washington. In December that year he received a ton of supplies purchased with his own funds and forwarded to him by the Arctic Club of this city, via Chesterfield Inlet, which enabled him to prolong his field work.

He spent the winter of 1911-12 in a small settlement of Eskimos at the head of Schultz Lake and started on March 20, 1912, for Bathurst Inlet on the Arctic coast with Mr. Street, three Eskimos and two native sledges. His letter to the *Bulletin* dated "Trade Island, Bathurst Inlet, June 5, 1912," announced that he had nearly completed his mapping of the unexplored part of Bathurst Inlet. His work in the Canadian north, as reported in his letters, is summarized in the volumes of the *Bulletin* for 1909, p. 624; 1911, pp. 134, 777; 1912, pp. 46, 608; 1913, p. 134.

SOUTH AMERICA

Dr. Hamilton Rice's Explorations. Dr. Rice recently returned from his latest explorations in South America. He prepared himself for geographical field research by courses of instruction in London and began his work with Prof. Hiram Bingham in Peru. About six years ago he made an important journey in the basin of the river Uaupés, one of the tributaries of the Rio Negro entering that stream from the west. He left home for South America again in 1912 especially to explore that part of the upper basin of the Amazon lying chiefly in Colombia. From Bogotá he carried out detailed survey work down the Ariari, unexplored for most of its course, to the Guaviare and thence to Italla. Early in the present year he was at San José on the Rio Guaviare and sent home letters giving a graphic account of his journey south from that point to the Ajaju River and back. In July, 1912, he descended the Ariari, established a base at San José and in August went on to the Calamar near the source of the Uaupés. He succeeded under many difficulties in taking observations which enabled him to construct a map of the region.

Late in September, 1912, he advanced with a party of 22 persons, including 7 Indians. At the Sutuya a raft was made and the path cut to the Macaya River. Beyond this stream a sierra over 3,000 feet in height, blocked the way. The higher peaks rose in perpendicular crests from hills which Dr. Rice describes as dissected and weathered into impassable barriers of precipitous cliffs, ravines, canyons and gorges. Pushing on to the Ajaju and securing observations there the party then retreated.

The Macaya was reached with the greatest difficulty after abandoning all the equipment. At San José, Dr. Rice obtained a canoe and ascended the Inirida. He expected to reach Manaos at the mouth of the Rio Negro early in the past summer and the absence of all news from him caused some uneasiness until he suddenly returned to civilization after the completion of a successful journey. Reaching the source of the Inirida, on Feb. 16, he descended this river to the Pafumana, ascended the latter to near its source and then crossing the swamps to the source of the Isana descended this stream to the Rio Negro and reached San Felipe early in August.

Among his important results was the establishment of the source of the Guainia with comparative accuracy. Dr. Rice says that coupled with the results of his former journey his new observations enabled him pretty well to clear up the geography of the northwest Amazon basin between the Guaviare, Caquetá and Rio Negro, an area of about 75,000 square miles. He made a great many observations for the determination of position and secured many interesting medical, anthropological and ethnological data.

Relation between Nile Floods and the Rainfall of Santiago, Chile. Mr. R. C. Mossman, of the Argentine Meteorological Office, contributes to the February number of *Symons's Meteorological Magazine* a short discussion of a new correlation which he has worked out between the annual Nile flood and the May-August rainfall at Santiago, Chile. By comparing the data for the Nile floods from 1869 to 1906, and the May-August rainfalls at Santiago for the same period, it appears that on the whole there is a marked opposition between the height of the flood and the Santiago winter rainfall. The latter varies with the position of the South Pacific anticyclone, which, in turn, varies in connection with the low pressure area at the Antarctic Circle, in the southern extension of the South Pacific known as Bellingshausen Sea. In some years this low pressure belt is pushed west by the northward extension of a portion of the Antarctic anticyclone over Graham Land which is located on the Cape Horn meridian. Then cyclonic systems, instead of following their normal path south of Cape Horn, approach the Chilean coast in low latitudes, and bring increased rainfall over the Santiago region. Thus another step in advance is made in the study of world meteorology. In time, Mr. Mossman believes, from the records of the nilometers, "it will be possible to obtain some idea of the sequence of weather changes since the time of the Pharaohs in the far South Pacific during the austral winter months."

R. DEC. WARD.

AFRICA

Great Depths in Lake Tanganyika. Captain Jakobs, of H. M. S. *Möve* has recently spent six weeks in researches at Lake Tanganyika. He says (*Zeitschr. Gesell. für Erdk. zu Berlin*, No. 7, 1913, p. 565) that any further surveys to facilitate navigation in the lake are unnecessary excepting in relation to the establishment of certain contemplated landing places. At one point only, near Cape Wambämbe, is there any danger to vessels in the coastal waters. A light or beacon is desirable only for the entrance to Kigoma and at the mouth of the Mlagarassi R.

The greatest depth he found in his soundings was 1277 meters (4,189 feet). This is an important advance upon the figures presented by Halbfass, who in his recent collection of data relating to the present status of lake exploration accepts 2,625 feet as the maximum depth of these bodies of water. Still greater depths are probable and a Belgian official is reported already to have discovered some of them. Apart from them, however, Lake Tanganyika appears to be second among the deepest fresh water lakes in the world, Lake Baikal being first with a recorded sounding of 1,523 meters (4,997 feet). As the surface of Tanganyika stands 780 meters (2,559 feet) above sea-level, the lake must be regarded as occupying one of the greatest crypto-depressions, for its floor sinks to 500 meters (1,539 feet) below sea-level.

Traffic of the Suez Canal. In 1912, 5,391 vessels passed through the Suez Canal, 412 more than in 1911. The receipts of the Canal Company were \$27,031,665 or \$341,731 over those of 1911. A slight reduction in the canal rates went into effect on January 1, and 35 vessels had anchored at Port Said and Suez to take advantage of the new toll rates. They accordingly passed through the canal on January 1 paying toll to the amount of \$168,924. It was the largest day of business both in transit and in receipts in the history of the canal.

Progress of the Katanga Railroad. *Deutsches Kolonialblatt* (Vol. 24, 1913, No. 18, p. 823) reports the completion of a second section of the Katanga R.R. from Elizabethville, capital of Katanga, to Kambove, 101 miles. The line is now in operation from Sakania on the southern frontier of Katanga to Kambove, 272 miles, employing 140 white men and 600 negroes. The road will now be extended to Bukama, 465 miles from the Rhodesian-Belgian boundary. It is at Bukama that the railroad from Benguela on the Atlantic coast of Angola will join the Katanga R.R. The latter road will be extended north from Bukama to the head of navigation on the Lualaba branch of the upper Congo.

Southern Katanga is now joined to Cape Town by rail; and the above mentioned projects, under way, will give it railroad connections with the Atlantic coast of Angola and steam connections by rail and river with the mouth of the Congo. The projected building of a short-line of road, Salisbury to the British line in Northern Rhodesia, will also give the great mining region of south Katanga direct rail connection with Beira on the Indian Ocean.

ASIA

Sir Aurel Stein's New Expedition. The *London Times* (Weekly Edition, Sept. 26, 1913) says that this explorer has been deputed by the Government of India to resume his archaeological and geographical explorations in Central Asia and further east towards the western borders of China. It is expected that his new work will occupy him for about three years. The geographical as well as the archaeological opportunities of the expedition will be cared for as fully as possible. Stein expects to go to Chinese Turkestan via a hitherto unexplored route, to spend the coming winter in explorations of the desert and then extend his work further east.

New Express Service between Tokio and Peking. Despatches from Japan announce that an express service was opened on Oct. 1 via Shimonoeki, Fusan, Seoul, Antung and Mukden, and travelers may now go from Tokio to Peking in 85 hours. Trains run twice a week with only one change between Fusan and Peking, namely at Mukden where passengers spend a night. The popular route heretofore has been from Kobe, which requires 144 hours.

AUSTRALASIA AND OCEANIA

Rainfall of Tasmania. The Central Weather Bureau of Australia has issued an "Average Rainfall Map of Tasmania," the fifth in a series now being prepared to show the annual rainfall distribution throughout the Commonwealth. The most striking feature of the map is the great variation for such a comparatively small area between the greatest and least average falls of rain, viz., 17.93 ins. and 115.82 ins., the effects of topographical and marine controls. The west coast, being exposed to the full sweep of the moisture-laden westerlies, and condensation being assisted by an altitude between 3,000 and nearly 5,000 feet, experiences frequent rains, and averages over 100 inches in places are the result. The map is very clear, and is on the same scale as the others of the same series.

R. DEC. WARD.

EUROPE

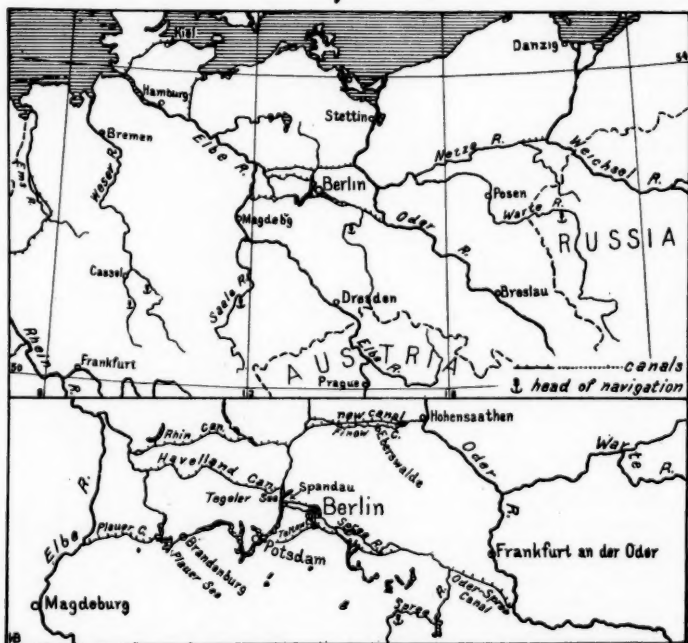
The English Channel Tunnel. A tunnel under the English Channel is just now the subject of a petition from an influential body in the British Parliament to the Premier. Albert Sartiaux, in the October *Revue des Deux Mondes*, says that the practical details have been carefully studied and preliminary works begun at both ends. These works include wells at either end from which trial tunnels, of a diameter of 2.14 meters, have actually been built out under the Channel, beneath Shakespeare's Cliff for 1,600 meters and from the French coast opposite for 1,800 meters. Though these beginnings were made long ago they are in admirable condition to-day and equipped with machinery that is still effective (!) The whole tunnel could be completed in four or five years at a cost well under \$80,000,000, even on the high estimate of cost that allows more per mile than in the St. Gotthard tunnel. It would consist of two parallel tubes about six meters in diameter, connected by frequent transversals. The geological studies are very complete, both on land and under the Channel, where the clean, current-swept floor has been examined by several thousand soundings with a cutting tube that brought up samples seven or eight centimeters long. These studies reveal a massive layer of argillaceous chalk admirably suited to carry the tunnel. It is sixty meters thick, without flints, watertight,

yet easily cut, and extends unbroken from England to France at a suitable depth. As this chalk-bed sags in mid-channel, drainage tubes would be built from its lowest point, sloping down to yet lower levels in wells at either end, where pumps would remove the water. The cost of all this is included in the above estimate. Instead of a military menace to England, the tunnel is now proposed as an item in her defences, a means of sending her food in war time and even the assistance of French soldiers, if needed to repel invading Germans.

MARK JEFFERSON.

A New Navigable Route Connecting Berlin and Stettin.

Professor P. Arbos, summarizing in *La Géographie* of Aug. 15, 1913, a previous article in the *Geographische Zeitschrift* (Vol. 19, 1913, No. 5, pp. 285-286), describes a new water route between Berlin and Stettin. Communication between the Elbe and the Oder had heretofore been carried on by means of the Finow and the Oder-Spree Canals. These two canals, however, are overloaded with traffic. For this reason the Prussian authorities have constructed a new canal for boats of 600 tons. This canal begins to the northwest of Berlin, follows the



(a) Map of Northern Germany Showing the Main Navigable Waterways. 1:9,500,000.

(b) Map of the Region between the Elbe and the Oder Showing the Main Canals. 1:3,000,000.

old Spandau Canal, which has been considerably deepened and enlarged, and thus leads to the Tegel See. It then follows the channel of the Havel, which has also been dredged to a greater depth, leaves it at Pinnow, and, continuing to the east, parallels the Finow Canal, which it subsequently crosses, and finally empties into the old Oder at Liepe. Five locks overcome the difference in level of 100 feet between the canal and the river. The canal debouches into the Oder

proper ten miles farther on, at Hohensaathen. It is hoped that, due to the opening of the new canal, the shipments of English coal for Berlin (800,000 tons in 1911 as against 1,250,000 tons of German coal) will, for the greater part, be sent via Stettin. The development of traffic between the Elbe, the Oder and the Vistula by way of the Plauer Canal, the Havel and the Berlin-Stettin Canal is looked forward to as an outcome of the opening of the new waterway.

I. ASSADA.

POLAR

Stefansson on His Journey North of Alaska. Advices received by the Canadian Government on November 5 said that Stefansson's vessels, the *Karluk*, the *Mary Sachs* and the *Alaska*, passed Point Barrow on August 8, 15 and 20 respectively. Reports from the natives were to the effect that they had seen no ice to the east. The expedition hoped to reach Herschel Island by August 24. All on board were well.

New Land to the North of Siberia. From time to time the *Bulletin* has reported the progress of Russian surveys along the northern coast of Siberia. These endeavors have been rewarded apparently by an important discovery. The correspondent of the *London Times* in St. Petersburg telegraphed on Oct. 13 that, early in September, Captain Wilkitzky, who was in command of the two vessels surveying the northern Siberian coast, found what is believed to be a large body of land forming the counterpart of Novaya Zemlya and enclosing the Kara Sea on the east. It was reported that the eastern coast line of the new land extends from about latitude 78° N., longitude 104° E., northwestward for 200 nautical miles, coming to an end in latitude 81° N. and longitude 86° E. Captain Wilkitzky christened the land he had discovered Nicholas II Land.

According to this despatch the southern point of the east coast of the discovered land is only about thirty miles to the north of Cape Chelyuskin, the most northern point of the Asian mainland, which was doubled by Nordenskiöld in August, 1878. Captain Wilkitzky attempted to double the cape from the east in the summer of 1912 but was prevented by the ice pack.

Mr. Hugh J. Lee, formerly with Peary in Greenland, writes to Mr. H. L. Bridgman of Brooklyn from St. Michael, Alaska, that these Russian exploring vessels *Taimyr* and *Vaigach* called at St. Michael in October for supplies and reported that last summer they also discovered a small island south of the De Long Islands. They were much disappointed at not being able to pass Cape Chelyuskin where again the ice stopped their journey along the coast. It was in their efforts to find a channel farther north that they sighted the new land.

During the three seasons the survey vessels have been on the Siberian coast, they have completed the survey from Cape Deshneff to Cape Chelyuskin. Nordvik Bay, west of the Lena Delta, is much larger than the old maps show, and the reported peninsula south of Preobrazheniya Island is really an island, as Nordvik Bay and Khatanga Bay are connected. The explorers were hampered in their survey of this bay by the uneven depths, finding in places 8 to 10 fathoms and then suddenly running into 18 and 19 feet. They also found a new bay on the east side of the Taimyr Peninsula up which they sailed for 20 miles and sent a motor boat 10 miles farther without reaching the head of the indentation.

The Schröder-Stranz Expedition. The *Herzog Ernst*, on which Lieut. Schröder-Stranz's expedition sailed for Spitzbergen in 1912, returned to Tromsø on Aug. 17 last with the members of the two search parties and seven of the fifteen members of the original party. Eight of the fifteen men perished in Spitzbergen and two of the survivors returned in a crippled condition. It is not likely that the exact history of this melancholy chapter in Arctic exploration will ever be known. The expedition reached North Cape on an island just north of Northeast Land, Spitzbergen, on the *Herzog Ernst* on August 15, 1912. The leader and four men left the ship with sledges, intending to reach the coast of Northeast Land and cross the inland ice to Treurenburg Bay in the northeastern part of New Friesland. The relief parties later could find no trace of

them. The ship reached this bay on Aug. 22, where it was caught in the ice. Nine of the eleven men on board, finding it impossible to free the ship, started on Sept. 21 for Wijde Bay, further west, hoping to make their way to Advent Bay, on the west coast of Spitzbergen. Dr. Moeser and Dr. Detmers went on ahead and were never seen again. Mr. Eberhardt also was lost, four men returned to the ship and Captain Ritscher alone reached Advent Bay. Everything possible was done by the relief parties to ascertain the fate of the missing men, but nothing was discovered. The *Herzog Ernst* was finally released from the ice, made seaworthy, and taken around to Ice Fiord, whence she returned to Europe. Captain Staxrud remained in Spitzbergen to carry out as far as possible the survey of the region between the north coast and Ice Fiord.

Dr. Mawson in the Antarctic. It will be remembered that Dr. Mawson and his comrades at Adelie Land were prevented by the sudden onset of winter, last year, from embarking on the relief steamer which had taken on board the detachment of Mawson's expedition under command of Mr. Wild. Mawson had expected that his entire party would return to Australia last year. The financial support he had received was not sufficient to pay the cost of a second journey to Wilkes Land. *The Geographical Journal*, October, 1913, p. 403, says that the Australian Government has granted \$25,000 in aid of the fund, bringing its total contribution to the undertaking up to \$50,000.

Honors to Surviving Members of the Scott Party. The specially designed Antarctic medals prepared by the Royal Geographical Society were presented to the surviving members of the Scott Expedition by Lord Curzon of Kedleston at a meeting of the Society on Nov. 10. At the request of the Italian Geographical Society he also presented to Lady Scott the Humbert Gold Medal awarded by that Society in memory of Captain Scott. Silver duplicates were presented to Mrs. Wilson, Mrs. Oates, Mrs. Bowers, and Mrs. Evans, widow of Petty Officer Evans.

PERSONAL

Professor W. M. Davis of Harvard University lectured on "The Lessons of the Colorado Canyon," at Denison University, Oct. 6; at Ohio Wesleyan University, Oct. 7; at Ohio State University, Oct. 8; at the State Normal College, Ypsilanti, Oct. 10, and at the University of Rochester, Oct. 13. He also spoke on "Glacial Erosion in Montana" at Ohio Wesleyan; on "The Bearing of Physiography on the Theories of Coral Reefs," at Columbus, and on "Experiences of an Exchange Professor at Berlin and Paris," at Ypsilanti.

Professor Ellsworth Huntington lectured before the Section of Geology and Mineralogy, New York Academy of Sciences on November 3 on "Changes of Climate during Historic Times."

Mr. L. B. Smith, Geological Engineer of The Associated Geological Engineers, Pittsburgh, Pa., has gone to the West Indies to examine supposed oil properties.

Professor W. S. Tower of the University of Chicago gave a lecture before the Geographic Society of Chicago on Oct. 10 on "A Journey between Northern and Central Chile."

OBITUARY

EDUARD PECHUEL-LÖSCHE. Prof. Dr. Pechuel-Lösché died at Munich on May 29, aged seventy-three years. He was well known during his middle life in the field of exploration, particularly in Equatorial Africa. In 1886 he completed his preparation at Jena as a teacher in geography. From 1894 he occupied the chair of geography in Erlangen till last year, when he retired. His scientific publications were numerous.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

(The size of books is given in inches to the nearest half inch.)

NORTH AMERICA

Letters from an American Farmer. By J. Hector St. John de Crèvecoeur. Introduction and notes by W. B. Blake. Everyman's Library. xxi and 256 pp. Index. E. P. Dutton & Co., New York, 35 cents. 7 x 4½.

Hazlitt wrote, more than 80 years ago, that the eighteenth century had produced in the North American Colonies, three notable writers, and that one of these three was the author of "Letters from an American Farmer."

These letters were first published in London (1782), and reissued with a few corrections the next year. The original American edition was published in Philadelphia in 1793; and in this present volume, we have the Letters correctly edited and once more brought to attention.

Crèvecoeur describes, in his somewhat idyllic style, the wonders and beauties of nature, and the provincial life, manners, and customs of the people of the Colonies in North America.

WILBUR GREELEY BURROUGHS.

A Short History of the American Negro. By Benjamin Griffith Brawley. xvi and 247 pp. Index. The Macmillan Co., New York, 1913. \$1.25. 7½ x 5½.

This volume is a record of careful study of scattered documents of history and a sympathetic digest of law bearing upon the title theme, an invaluable work wherewith to clear the ground for such as may be called upon to study this important element in our population.

Having accomplished so much, and it is a very successful accomplishment, Prof. Brawley stops at the point where the real study must be prosecuted. The study of the negro must be the study of negroes. He gives us glimpses which tantalize when they attract. It is not enough to see the leadership of Denmark Vesey, the aspiration of Dr. Washington, the respect which Frederick Douglass commanded from the unwilling, the spirituality of Sojourner Truth, the humanity of Uncle Remus the historian. It is with purpose that I include him; those others are negroes *in posse*, striving to make their way to the higher life; Uncle Remus is the Negro *in esse*. To comprehend what the negro races may make of themselves in the race tangle which is now the American negro, what they may produce in their art and industry—to comprehend we must retrace the bitter voyage of the slave ships. We must study in Africa these human animals; we must familiarize ourselves with the Mandingo who can lead men, with the thrift of the Hausa in Nigeria, with the oratory of the Yoruba. The negro is not simple, he is a magma of many negroes. This little volume will serve an excellent end if it clear the way for students to seek in Africa the cradle of all the characters which, without such study, are to confuse those who seek to study the negro in America.

WILLIAM CHURCHILL.

The Ultimate Solution of the American Negro Problem. By Edward Eggleston. 285 pp. Richard G. Badger, Boston, 1913. \$1.50. 7½ x 5.

A volume which is written with a rather pompous show of learning and an appearance of special pleading. Its theme is the natural inferiority of the negro and his inevitable submergence in America under the pressure of the superior white race. One would have more confidence in the author's reasoning

if he did not make so much of *Pithecanthropus erectus* and of Java as the assured birthplace of the race, and if he had omitted the assertion that geologists believe "the total existence of the human race to have covered a period of 20,000,000 years or more." Indeed the author thinks our kind has been here for "at least 20,000 Christian eras" and he adds that Pleistocene times were "several million" years ago. He quotes without dissent a reference to the ice invasions as coming from polar ice caps, and he does not seem to know the Darwinian meaning of the *survival of the fittest*.

The argument of the first chapters is that the evolution of man from his prehuman ancestors has taken a stupendous length of time, that the white man has far outrun the negro in this eon of development, and that the negro must fall out in the race. In his present free state, he is depressed rather than elevated by free competition, and increasing segregation brings his inferiority to the surface in bad hygiene and high death rates. The best part of the book is based on census showings of the progressive decrease of relative populations, as compared with the whites. Thus the author concludes that the negro as a serious southern problem will disappear within a hundred years, when we shall perhaps protect him from extermination, as we shelter the Indian today.

Education beyond reading, writing, and a little counting, is regarded as particularly bad, and many of those who favor education are charged with also favoring amalgamation. The argument of the volume should have been shorn of verbiage and compressed into a review article. A. P. BRIGHAM.

California Coast Trails. A Horseback Ride from Mexico to Oregon. By J. Smeaton Chase. xvi and 236 pp. Ills., index. Houghton Mifflin Co., Boston & New York, 1913. \$2. 8½ x 5½.

The Pacific is bluff to the lip of the sea, its harbors are widely scattered, and always the rocky shore is at the lee. He who would best see the best of California must do as did this author, mount a sturdy horse and follow the trails across mountain masses and through the valleys. From the Mexican border to the Klamath River he traversed deserts and forests, followed canyons and trails of wild game, and here and there on his pleasant journey he came to the cities of men. His record shows him heartily appreciative of the scenes, the history of nature and the history of man, which lay along the line of his progress. It may well be that few of his readers will yield to the call of this wild and adopt this narrative as a guide book for the long ride, yet it would serve well for those who have leisure and a good seat in the saddle. But for the less adventurous who know San Diego, Los Angeles, any one of a score of ancient missions, who know the spots of tourist resort, this agreeable volume may fill in the gap of the blue mountains which bound the view and tell some tale of what may lie beyond.

WILLIAM CHURCHILL.

Histoire du Canada. Par François-Xavier Garneau. Cinquième édition, revue, annotée et publiée avec une introduction et des appendices par son petit-fils Hector Garneau. Préface de M. Gabriel Hanotaux. Tome I: 1v and 610 pp. Félix Alcan, Paris, 1913. Fr. 10. 9½ x 7½.

This last edition of a well-known work has a portrait of the author. He died while preparing for the press the fourth edition of his book. The editor of the present edition is his grandson. The work has been greatly improved. While the four preceding ones were deficient in quotations of sources, so indispensable to historical investigation, the new edition supplies this want very fully. Up to date only the first volume has appeared, covering the period between 1492 and 1744. Two chapters treat of the earliest notions about a western continent suspected to exist and the voyages of Columbus, finally the discoveries of Canada by Cartier and his (temporary) settlement. The author very justly eliminates the two supposed discoveries of Vespucci from the list of voyages but remains in error through repeating the accusations against the Florentine of a claim to discovery in 1497. That claim was never advanced by him, but was a fraudulent attempt with which he was not connected. The geographical data are important and identification of sites

is plentiful. Interesting details on the Indians abound. The appendix contains a valuable bibliography of sources and evidence corollary to the main topics of the book.

AD. F. BANDELIER.

Trails, Trappers, and Tender-feet in the New Empire of Western Canada. By Stanley Washburn. xvi and 350 pp. Map, ills. A. Melrose, London. Henry Holt & Co., New York, 1912. \$3. 9 x 6.

The author opens his book with an apology for adding another volume to the "vast list with which the much abused public is already surfeited." One of his excuses for writing is acceptable since it expresses his desire to place on record the conditions existing in the wilds of Canada that are now being penetrated by the ever advancing foot of civilization and soon will be a land of all modern conveniences.

The story of the author's experiences in Western Canada on successive tours is related very largely from the standpoint of the experiences encountered by uninitiated explorers. Therefore it is instructive for the person who contemplates similar trips. The vivid style fills one with admiration for Western Canada.

EUGENE VAN CLEEF.

CENTRAL AMERICA AND WEST INDIES

Hurricanes of the West Indies. By Oliver L. Fassig. 28 pp. Maps. *Weather Bureau Bull. 10*, U. S. Department of Agric., Washington, 1913. \$1.50. 11½ x 9½.

The hurricanes of the West Indies have an increasing interest for American meteorologists because of the approaching opening of the Panama Canal and the resulting considerable changes in many sailing routes. Hence this is an opportune time for a further investigation of these remarkable phenomena, especially of their origin, frequency, monthly distribution and tracks. Professor Fassig, who was for several years in charge of the Weather Bureau work in Porto Rico, and who, during that period, made himself thoroughly acquainted with the climatology of that island as well as with the meteorology of the surrounding areas, has given us a report on the *Hurricanes of the West Indies* which is timely and valuable. The material upon which he has based his studies is chiefly that of the past 35 years, but he has not neglected the results of earlier investigations. The matter is presented clearly and concisely, without too much attention to details, and the charts and diagrams are well chosen and distinctly helpful.

Professor Fassig is of the opinion that the seasonal variations in position and intensity of the "centers of action" will furnish the explanation of the origin of these violent disturbances. Quoting Eliot's well-known passage in the "Handbook of Cyclonic Storms in the Bay of Bengal" (1900) regarding the conditions which give rise to cyclonic storms in that region, Professor Fassig concludes his discussion as follows: "Similar conditions are doubtless produced within the hurricane area of the West Indies by the advance of the North Atlantic high into the region of calms, or by the conflict between the opposing winds of the North and South Atlantic high areas, resulting in the formation of hurricanes, just as the advance and the retreat of the high area over the South Indian Ocean gives rise to the southwest monsoon and the squalls and cyclones over the Bay of Bengal." A somewhat fuller discussion of this important point would have been welcomed by meteorologists.

R. DEC. WARD.

The British West Indies. Their History, Resources, and Progress. By Algernon E. Aspinall. xii and 435 pp. Map, ills., index. Little, Brown, & Co., Boston, 1912. \$3. 8½ x 6.

If this volume strikes the reader as lacking in consistency between its several chapters it is to be remembered that Mr. Aspinall is the author of the standard guide to the region and has acquired a method of treatment which must prove hard to shake off when preparing a new work on the same

topic. Yet there is a certain appropriateness in this comment. Among the oldest of British dominions oversea, the British West Indies is the most backward, the least developed, the most negligible in the councils of empire; the reason is to be found in the lack of consistency and coherence among the island units of administration. For each of these units Mr. Aspinall furnishes an interesting sketch of discovery history. It cannot fail of interest even in an arid method when we remember that this was the Spanish Main and that it is proper in this history to give respectful attention to Morgan and the buccaneers and to look upon pieces-of-eight as moneys of account. The present receives equal attention with the past. As a work of trustworthy information this work adjusts itself in excellent balance to the "All Red" series of hand-books of the British Empire in which it is a unit. WILLIAM CHURCHILL.

SOUTH AMERICA

La Carte de la République Argentine. Mémoire présenté au Xème Congrès International de Géographie. Par B. G. Aparicio. Inst. Géogr. Militaire, Buenos-Aires, 1913. 8½ x 12.

A valuable though incomplete bibliographical work. The lists of maps and geographical books provide the best reference material on the country. Much of the text has already appeared in the recently published first report of the Argentine Instituto Geografico Militar. (See *Bulletin*, Vol. 45, March, 1913, p. 199.) It is much more exhaustive, however, in its present shape.

The publication is instructive as showing that Argentine cartography comprises a far larger number of maps than have been published in any other South American country. Various public departments have issued maps on different scales and practically every province is provided with a cadastral compilation. The state of progress of the standard Argentine topographical map (1:100,000) and the work carried on in preparation of the country's contribution to the 1:1,000,000 map of the world are fully described.

Einwanderung und Einwanderungspolitik in Argentinien. Von Dr. Georg Hiller. Mit einer Einleitung von Dr. Julius Wolff. xi and 159 pp. Dietrich Reimer, Berlin, 1912. Mk. 5. 9 x 6½.

The Argentine Republic has about 7,500,000 people, the United States 97,000,000. Argentina is admitting annually 200,000 or 300,000 and keeping 40 per cent. of them, while we admit about 1,000,000, of whom over half leave us. We keep less than 50 per cent. We have note of these departures for five years now, but the Argentine Government has the credit of a record of departures since 1871, and of arrivals since 1857. Previous migrations of peoples, fascinating as they have been, have been usually shrouded in mystery. For the first time here is it possible to examine one in the light of actual facts. Canada has about the same population and about the same immigration, but as far as I know the departures are not recorded. At present we are annually retaining in the country immigrants amounting in number to about half of one per cent. of our whole population. The Argentines are getting and keeping an increment of nearly two per cent. a year. About a third of their whole population is foreign born. These immigrants have made the Argentine agriculture that is touching the world's markets. A poor laborer there may by diligence and economies, such as the Italians know well how to practice, save money, buy land and become independent, but it is no child's play. Germans may do it, but are mostly in trade or are skilled laborers. The policy of the government is helpful. The book gives a very real picture of the life of the immigrant, and the author's second part on "colonization" will be looked for with interest.

MARK JEFFERSON.

AFRICA

The Shilluk People, Their Language and Folklore. By Diedrich Westermann. lxiii and 312 pp. Map, ills. Board of Foreign Missions of the United Presbyterian Church of N. A., Philadelphia, Pa., 1912. D. Reimer (E. Vohsen), Berlin. 10 x 7½.

A linguistic study of the Shilluks who live west of the White Nile between

Fashoda and Khartum. To those who are not interested in the science of language the introductory pages will be the valuable part of the book. This includes brief statements of the physical features, the flora and fauna, and the Shilluks themselves with their customs, occupations, family life, religion, political institutions and history. The book has three parts, Grammar, Folklore and Dictionary. The first part is formulated on the plan of most text books of languages. For a more intimate study of the people than can be gained from the introductory account, the folklore chapters offer opportunities. The stories are in the main given first in the Shilluk language and then in English and the tales have been classified. They relate to occupations, social and political institutions, sickness, war, traditions, religion, animals and adventures. The kinship of the Shilluks to other peoples all the way from Victoria Nyanza to Khartum represent migrations, probably, of groups from the original stock.

ROBERT M. BROWN.

My Sudan Year. By E. S. Stevens. x and 305 pp. Ills. George H. Doran Co., New York, 1913. (?) \$3.50. 9 x 6.

A charmingly told story of a brief trip up the Nile to Khartum and the Sudd region. Miss Stevens has attempted, and in large measure succeeded, in giving us a vivid picture of the Sudan city and its immediate environment. So recently has the region emerged from the state of unrest that one marvels at the order; reconstruction seems to have been accepted gracefully, and no signs of the terrible scenes of the Mahdist régime so forcibly told by Father Ohrwalder now remain. The author's visit to Khartum and Omdurman, the real centers of the Anglo-Egyptian Sudan, enables her to give an insight into the educational system, the workings of local courts of justice and the real character of the mixed population. The story of the trip to the sudd and back is fascinating reading. The efforts to keep the river open, the use of the sudd as fuel, the increased facilities of transportation and the life along the way are a few of the features.

ROBERT M. BROWN.

Hausa Superstitions and Customs. An Introduction to the Folk-Lore and the Folk. By Major A. J. N. Tremearne. xv and 548 pp. Map, ill., index. John Bale, Sons & Danielsson, Ltd., London, 1913. 21s. 9 x 5½.

There are few fields of folk-lore study which can pass in interest beyond the region of Africa from which this portly volume draws so generously. The reason is not far to seek. In much of the record of the belief and the recreative fiction of savage, or at least inferior, folk we are dealing with unfamiliar thoughts and with characters which we admit but charily to our company. But this is at the very focus of Brer Rabbit and the Tar Baby, and for reasons wholly unassociated with scientific investigation of such material these are no strangers to our thought. In these tales the characters are the Spider and the Rubber Girl, but the central theme remains the same as that which Uncle Remus has made familiar. We are particularly impressed with the scrupulous method pursued by the collector of the stories in this volume. It is essential to such a record that we have the data on which to evaluate the character of the teller of the stories, and this is amply provided here. Experience has shown that a collector must be a faithful recorder and no more. The most trifling question will interrupt the smooth course of a story and even the slightest request for information will distort the record. It is well that Major Tremearne has been so filled with the sense of the sanctity of the record, for we may feel confident of the accuracy of his report. His notes are simple comment upon fact and reference to the literature of the subject which will facilitate study based upon these collections. In one particular we think his method at fault. In such material there must always be a certain amount of incident which in our culture is regarded as uncouth; he has chosen to deal with this by the use of English words which may suggest the vulgar term; a far better method is to employ the Latin and be as frank as is necessary.

WILLIAM CHURCHILL.

In the Heart of Savagedom. Reminiscences of Life and Adventure during a Quarter of a Century of Pioneering Missionary Labours in the Wilds of East Equatorial Africa. By Mrs. Stuart Watt. Edited by her Husband. 472 pp. Ills. Marshall Brothers, Ltd., London, 1913 (†) 7s. 6d. $8\frac{1}{2} \times 6$.

The story of this book covers twenty-five years (1885-1910) of missionary work mostly in the vicinity of Victoria Nyanza, Africa. The lack of a map and the use of many local names not found in gazetteers or atlases prevents a careful following of the itinerary of these brave and devoted people. Of course, the native rather than the physical features or the flora and fauna is the real theme; still encounters with the wild animal life of the country, the pursuit of game, the passage through areas under different degrees and conditions of vegetation and a few photographs of bits of scenery furnish a basis for an estimate of some other phases of Africa. The status of the natives has changed somewhat since the days of these pioneers, and transportation from the coast is no longer a weary march along a narrow and imperfect trail. The book to the layman yields an intelligible standard by which the progress of African countries may be determined.

ROBERT M. BROWN.

A Stanleyville. Par A. Detry. 222 pp. Imp. "La Meuse," Liège, 1912. Frs. 4. $8\frac{1}{2} \times 5\frac{1}{2}$.

A book partly anecdotal, sketching the life of whites and blacks who live 1,200 miles up the Congo in the neighborhood of Stanley Falls; with many sketches of the customs and beliefs of the natives, description of flowers, fruits and garden products and discussions of some African problems relating to disease, infant mortality, criminal law, native vagabondage, the growing Mohammedan influence, the introduction of silver money, etc.

Le Congo Méconnu. Par Jean Dybowski. Préface de M. J. L. Lanesan. xiii and 294 pp. Map, ills. Hachette et Cie, Paris, 1912. $7\frac{1}{2} \times 4\frac{1}{2}$.

Captain Dybowski, one of the most conspicuous explorers of the northeastern part of the French Congo and an authority on the resources of the French colonies in tropical West Africa, gives here the results of his long and thorough studies of the work done and still to be done in the development of French Equatorial Africa, formerly called the French Congo. The first half of the book gives a very clear account of the exploration of that vast region and the establishment of French sovereignty over it. The second half is chiefly devoted to the tribes and the agricultural resources of the French Congo, the author designating large areas where the possibilities of economic development are enormous. He gives the first rank to cacao, vanilla, and the cocoanut as common farm crops along the coast of this colony.

The efforts to develop agriculture in French West Africa, first in importance among the African possessions of France, is now well organized. The government has established there agricultural experiment stations whose results are most encouraging. The natives are planting rubber in that colony, and over 1,000,000 plants are now under cultivation with excellent prospects.

Captain Dybowski calls for the establishment of the same régime in French Equatorial Africa and especially for the construction of railroads that will link the far interior with the coast. He shows that without the development of a good system of communications a large part of this vast domain will be almost worthless to France. His book is one of the most carefully written, informing and authoritative works on any part of French Africa.

ASIA

The Flowery Republic. By Frederick McCormick. xv and 477 pp. Ills., appendix. D. Appleton & Co., New York, 1913. \$2.50. $8\frac{1}{2} \times 5\frac{1}{2}$.

Mr. McCormick has lived long in Peking and other parts of China. He has wide acquaintance with its public men, and as an American newspaper correspondent he has been the historian of the momentous events that have

occurred in China during the past twelve years. He is uncommonly well-equipped to write such a book as this, which is the story of the recent revolution in China and the great impulses that pushed the country forward towards modernization. His book is packed with information and with comment that helps the reader understand the progress of great events. The topic is somewhat involved because the revolutionary movement was widely spread over the provinces, many of which were not closely united in their ideas of the nature, purposes and probable effects of the revolution. In perusing this valuable work the reader will be considerably helped by consulting often the "Diary of the Revolutionary Rebellion" in the appendix.

Meine Vorderasienexpedition 1906 und 1907. Von Hugo Grothe, Vol. 2: xvi and 318 pp. Map, ill. K. W. Hiersemann, Leipzig, 1912. Mk. 32. 10½ x 8.

The promise of the first volume of this great work (*Bull.*, Vol. 44, 1912, page 302) comes to the richest fruition in this second volume. In the former volume the author assembled many monographs dealing with technical details of his discovery. Here he occupies the whole volume with a carefully elaborated essay upon the Anti-Taurus region, its historical and physical geography and its population.

For half of 1906 and the whole of 1907 Dr. Grothe traversed this highly interesting region, scaling heights and penetrating into the recesses of valleys. Very little can have escaped his observant eye. He came prepared with full acquaintance with all the Greek, Latin and mediæval accounts of this country, and in the field itself he strove to lay clear the Hittite record of the dawn of history. To unravel the tangles of classical and middle age geography is a specialty in which few have proved proficient, yet Dr. Grothe shows himself a master of a peculiarly crabbed art.

In his report upon the ethnology of the Anti-Taurus he gives an account of the Kizil Bash which is far more complete than has ever been supplied by travelers.

AUSTRALASIA AND OCEANIA

The Mafulu Mountain People of British New Guinea. By Robert W. Williamson. With an introduction by A. C. Haddon. xxiii and 364 pp. Map, ill., index. The Macmillan Co., London and New York, 1912. \$4.50. 9 x 6.

The author is a recent volunteer in that group of hard-working English ethnologists whose labors are most largely directed by Dr. Haddon of Cambridge. Their method is always painstaking, at times it seems artificial, but it is not to be denied that they amass a great store of data. The Mafulu of this study live in the mountains about sixty miles due north from Port Moresby, a people wholly dissimilar in all the matters of physique, speech and life habit from the mixed races of the coast of the Gulf of Papua. The author modestly suggests their affiliation with the primitive negrito type which may be regarded as autochthonous in the eastern lands of Malaysia. The linguistic results of this expedition are discussed very fully by Sidney H. Ray with a most commendable study of the problems of grammar. We note with particular interest a detail of art which the author has inaccurately interpreted. At page 203 he makes the entry "netting worked on the common principle of the reef knot," and he illustrates it by a diagrammatic drawing. Now, as a matter of fact, the reef knot is so far from being the common principle of netting that its occurrence calls for particular notice. I have found but three examples of this knot; one was in an island off the shore of New Britain, one among the Tsimshian Indians of British Columbia in which my discovery was shared by the late Prof. Davidson, one in remains of the Swiss lake dwellers. This Mafulu instance adds a fourth to this brief list, apparently representing a stage in industry far lower than the discovery of the netting needle.

WILLIAM CHURCHILL.

POLAR

Die glaciologischen Beobachtungen der Danmark-Expedition.

Von I. P. Koch und A. Wegener. Danmark-Ekspeditionen til Grønlands Nørdostkyst 1906-1908. 77 pp. Maps, ill. *Meddelelser om Grønland*, Vol. 46, 1912, No. 1. C. A. Reitzel, Copenhagen, 1912. Kr. 5. 11 x 7.

The *Meddelelser* has come to be the place of publication for the scientific results of Danish expeditions, and we have seldom seen a more generally adequate and successful treatment of scientific results than is afforded by the report under review. Additional interest is given it owing to the fact that Capt. Koch and Dr. Wegener have already returned to Greenland in company for the purpose of crossing the inland ice along its widest section and carrying out scientific observations en route. The junior author of the report is a trained meteorologist well and favorably known for his published monographs which deal particularly with the free atmosphere.

To the student of glaciology the Danish Northeast Greenland Expedition of 1906-1908 was notable for the first discovery of shelf or barrier-ice ever recorded from the Arctic region. This shelf-ice, which is described in the report as "floating inland-ice," differs in some respects from any that has yet been described from the Antarctic. The larger area located in Glacier Bay (Jökulbugt) stretches northward through more than a degree of latitude (78°-79° N.) and has a width of about 40 kilometers. It is fed by ice which descends in an easterly direction through low outlets from the inland-ice, and its eastward extension is arrested by a nearly parallel range of rocky islands. Between these islands it pushes out in flat tongues which do not calve bergs but sometimes merge with the sea-ice. This Jökulbugt shelf-ice is stranded near the inland-ice margin and locally at other points, but it is generally floating and possesses a motion which is evinced by a tide crack, by fissures, etc.

Unlike the Antarctic shelf-ice which has thus far been carefully studied, the Arctic type is composed neither of snow nor of snow-ice, but of true glacier ice. Its fissures reveal a stratified structure and at a depth of from 25 to 35 meters a generally flat bottom with the appearance of salty ice. Like the inland-ice by which it is nourished, its surface is locally characterized for considerable areas by uniform low hillocks due to melting which has been controlled by a network of fissures. These hillocks (Schmelzhöcker) in different districts vary in height from 5 to 10 meters and in length from 300 to 1,000 meters.

Where the inland ice thus spreads over the margin of the continent and invades the sea, the mountain rampart is relatively low, but farther to the northward the coastal belt of mountains becomes broader and higher. For this reason the inland ice is there unable to reach the sea and marginal mountain glaciers are nourished. Within this district are found curious "snow-drift glaciers" due to snow collected from wind drift in valleys; and beneath these irregular glaciers streams of water flow within grottoes which are overhung by a rich and picturesque development of ice stalactites.

The same network of fissures which both in the inland-ice and in the shelf-ice has produced the *Schmelzhöcker*, sometimes yields a remarkable effect where the inland-ice is melted down about a nunatak, as, for example, opposite Jattenbrinken. Here a vertical cliff of ice is broken into squared columns so as to resemble in form a cliff in well-jointed limestone.

Interesting "horse-shoe" moraines like those long since described by Jensen from southwestern Greenland, are described and illustrated by excellent photographs.

WM. HERBERT HOBBS.

THE WORLD AND PARTS OF IT

Monograph on the Sub-Oceanic Physiography of the North Atlantic Ocean. By Edward Hull. With a Chapter on the Sub-Oceanic Physical Features off the Coast of North America and the West Indian Islands. By Prof. J. W. Winthrop Spencer. viii and 41 pp. Maps. Edward Stanford, London, 1912. 21s. 18 x 13.

Dr. Hull cherishes the belief that the Atlantic basin and shores rose in late

Tertiary time 6,000 or 7,000 feet above present sea-level, and caused the Ice Age. This volume is meant for evidence. J. W. Spencer writes a chapter. The evidence, not new, is the submerged canyons of the Hudson, the Congo and the Adour. Other streams are said to show them, but the detailed maps supplied do not appear to warrant the statement. Plate II shows a fine 200 fathom canyon for the Loire, approaching within 10 miles of land, but this is flatly contradicted by the detailed soundings of Pl. III. There is no such canyon. At p. 8 we read "Its channel has been silted up so that there is difficulty in tracing its course by soundings." Apparently the evidence of its existence is Prof. Hull's faith in it! So of the Nile, p. 14: "It is much to be regretted that the solid channel of the Nile valley cannot be traced under the Mediterranean, owing to the enormous amount of sediment, etc." "That there does exist a continuous channel * * * there can be no doubt." Again in the North Sea; by the glacial drift "as well as by the silt of existing rivers, the old river channels, which undoubtedly exist, have been filled up, etc." (p. 8). It is of interest that Buchanan, who is named in connection with the Congo soundings, referred the Congo canyon to the lack of deposition of silt from the river along the extended axis of the channel, while enormous quantities were deposited alongside. That was in 1887. He was very likely wrong, but it would have been well to have mentioned his view.

The Gulf Stream was 10° cooler off the Bahamas when uplift kept it out of the Gulf of Mexico! I think Schott estimates, from volume measures, that most of it never enters the Gulf, but passes northward east of the Antilles, just as in the supposed case. Norway is *not* capped by a central snow field, of which the Jostedal Glacier is a tongue. The thesis of this book may some day be established, but it will have to be done by examining and weighing evidence. This book does neither.

MARK JEFFERSON.

OCEANOGRAPHY

Scientific Papers. By J. Y. Buchanan. Vol. 1: xii pp. and 15 papers. Maps, diagrams. University Press, Cambridge, 1913. G. P. Putnam's Sons, New York. 10s. 6d. 9 x 6.

A welcome volume of reprints, hard to refer to for lack of continuous paging, so badly edited that No. 11 is actually reproduced entire in No. 14! A great array of oceanographic matter that is more detailed than a geographer's knowledge of the subject, and yet intelligible, mostly, to a general reader. Especial interest lies in the "Landslopes Separating Continents and Ocean Basins," "Tidal Currents in the Ocean" and "Ocean Shoals." There are cliffs and slopes as rugged in the borders of the ocean as in the most mountainous regions of the earth's surface; for instance, note the sinker that touches in 550 fathoms, tumbles, touches in 620 fathoms and stops finally at 835 fathoms!

Nearer land gentler slopes occur where the land has been cut back by the waves, from depths of, say, 30 fathoms. In the strong winds and waves of the Irish and Biscayan coast this cutting back has been severe; in stiller waters near the equator, trifling. Off the African deserts the slopes descending to ocean depth are steep; off the Congo mouth great silt deposits have shoaled and made gentle the descent. Only in the submarine canyon of the Congo is the normal slope of the ocean border preserved, on a profile from land to sea. The canyon has been built up by great deposition alongside and no deposition in the axis of the river valley, extended seaward. Along this axis a vertical circulation prevents deposition by stirring the water. This consists of the light river water moving outward above, and the heavy salt sea-water moving landward beneath—not observed but inferred, to match the observed ones at Gibraltar and the Bosphorus. Ocean shoals turn tide to current and these currents sweeping sediments away afford condition for deep corals which are found building up in 400 fathoms and so on up till at 50 fathoms, or less, they are destroyed. Such reefs stand almost columnar.

On appliances, instruments of the *Challenger* date, and observations, the book has an abundance.

MARK JEFFERSON.

METHODOLOGY AND TEACHING

Grundzüge der Physiogeographie. Auf Grund von William Morris Davis' "Physical Geography" neu bearbeitet. Von W. M. Davis und G. Braun. xi and 322 pp. Maps, ill., index. B. G. Teubner, Leipzig, 1911. Mk. 6.60. 8½ x 6.

Here is a good account of Professor Davis' doctrines on the land forms; the geographical cycle in humid, arid and glacial climates. It is not a translation of the Physical Geography. That was somewhat simplified for American high schools and had a good deal of matter in it "to emphasize the human relations." It used technical terms but sparingly, *cuesta* and even *peneplain* occurring only in footnotes. The present work is meant for German gymnasia and early university classes and contains the substance of the lectures on physical geography given at Harvard in the years preceding 1898 set forth in rigorous form with all the equipment of technical terms. There is a glossary of these, in German and English, in which, oddly enough, *cuesta*, *peneplain*, *consequent*, *insequent* and *obsequent* do not occur. There is a good 10-page account of the cycle of erosion, as much new matter on glacial erosion, and a good statement of the cycle in arid climates, while structure, process and stage are heard from. Throughout are found evidences of the thirteen years of active thinking by the author, already published, it is true and often in fuller form, but here first gathered together to form a systematic whole.

Thus the book is larger and fuller than its predecessor when the size of page and fewer illustrations—less than half—are allowed for.

An attempt has been made to adapt the book to Europe in every way. As far as this applies to the illustrative land forms of the general scheme it is not wholly successful, but for application of the principles a good many European examples are cited that are new on this side the water. Braun's translation is excellent, at times distinctly improving the text in directness and simplicity:

Davis, 1898, p. 254
"Revived rivers give a simple explanation of the origin of certain lengthwise and crosswise valleys."

Davis and Braun, p. 210
"Der Vorgang der Wiederbelebung der Flüsse gibt eine Einfache Erklärung u. s. w."

p. 324
Where the temperature is so low that the snowfall of the colder season is greater than the loss by melting in the milder season.

p. 251
In Gegenden, in denen infolge niedriger Temperatur, die in der kalten Jahreszeit gefallene Schneemenge im Sommer nicht wegschmilzt.

p. 265
Nearly all parts of the land would be covered with a sheet of waste many feet deep, and bare ledges would be almost unknown if it were not for the movement of the waste after it has been loosened.

p. 219
Nahezu die ganze feste Erde ist mit einer einige Dezimeter oder mehr tiefen Schuttlage bedeckt, und kahle Flächen bestehen nur da, wo der Schutt so schnell fortgeführt wird, als er sich bildet.

The book will be found indispensable to any German student of physiography who would not neglect contributions so important as these of Professor Davis.

For Germany their value will not be diminished by the severe, almost hostile tone of Passarge's Physiologische Morphologie, which has closely followed it and controverts its principles in detail.

MARK JEFFERSON.

OTHER BOOKS RECEIVED

These notes do not preclude more extended reference later

NORTH AMERICA

L'AMERICA DEL NORD. Di A. Michieli. Series: Biblioteca della Università Popolare Milanese. 88 pp. Maps, ills., index. Federazione Italiana delle Biblioteche Popolari. Milan, 1913. L. 1.50. 7 x 4½. [Geographical sketch including a summary of the progress of our knowledge of the continent from its discovery.]

A HISTORY OF THE PEOPLE OF THE UNITED STATES FROM THE REVOLUTION TO THE CIVIL WAR. In 8 vols. By J. B. McMaster. Vol. VIII (1850-1861). xix and 556 pp. Maps, index. D. Appleton & Co., New York and London, 1913. \$2.50. 9 x 6½. [Includes résumés of development in the Far West, an account of the surveys of Pacific railroad routes and descriptions of travel on the plains.]

SENIOR GEOGRAPHY OF NORTH AMERICA. (From "Text-book of Geography.") By G. C. Fry. vii and 44 pp. Maps, index. University Tutorial Press, Ltd., London, 1913. 1s. 7 x 5.

CENTRAL AMERICA AND WEST INDIES

PANAMA AND THE CANAL. By A. B. Hall and C. L. Chester. ix and 236 pp. Maps, ills., index. Newson & Co., New York, 1913. 75 cents. 7½ x 6. [The educational character of the work fits it for use as a reader with text-books on geography and history.]

PANAMÁ Y EL CANAL. Obra Original de A. B. Hall y C. L. Chester. Traducida al castellano por R. D. de la Cortina. xv and 237 pp. Maps, ills. Newson & Co., New York, 1913. 75 cents. 7½ x 6.

SOUTH AMERICA

L'AMERICA DEL SUD. Di A. Michieli. Series: Biblioteca della Università Popolare Milanese. 102 pp. Maps, ills., index. Federazione Italiana delle Biblioteche Popolari. Milan, 1913. L. 1.50. 7 x 4½. [Much space given to Italian emigration.]

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NEW MAPS

EDITED BY THE ASSISTANT EDITOR

For system of listing maps see p. 75 of this volume

MAPS ISSUED BY UNITED STATES GOVERNMENT BUREAUS

U. S. GEOLOGICAL SURVEY

*Topographic Sheets**(Including Combined and Special Topographic Maps)*

Arkansas-Oklahoma. De Queen Quadrangle.* Surveyed in 1908-1911. 1:125,000. 34°30' - 34°0' N.; 94°30' - 94°0' W. Contour interval 50 ft. Edition of June 1913.

California. Bishop Quad.* Surveyed in 1910 and 1911. 1:125,000. 37°30' - 37°0' N.; 118°30' - 118°0' W. Interval 100 ft. Edit. of May 1913.

Colorado. Leadville Mining District. Surveyed in 1911. 1:9,600. 39°16.0' - 39°13.6' N.; 106°20' - 106°13' W. Interval 25 ft. Edit. of June 1913. [Special map on a large scale. Mine prospects and shafts shown. Shafts are identified by red numbers referring to an index printed on the map. The whole of the city of Leadville is included on the sheet; the correct representation on it of the individual houses and built-up areas, hard to obtain for our American cities, is of value anthropogeographically.]

Idaho-Montana. Lolo Quad. Surveyed in 1911. 1:250,000. 47°0' - 46°0' N.; 115°30' - 114°30' W. Interval 200 ft. Edit. of Oct. 1913.

Illinois. Lincoln Quad.* Surveyed in 1911. 1:62,500. 40°15' - 40°0' N.; 89°30' - 89°15' N. Interval 10 ft. Edit. of July 1913.

Iowa. Slater Quad.* Surveyed in 1911. 1:62,500. 42°0' - 41°45' N.; 93°45' - 93°30' W. Interval 20 ft. Edit. of May 1913.

Kentucky. Drakesboro Quad.* Surveyed in 1911. 1:62,500. 37°15' - 37°0' N.; 87°15' - 87°0' W. Interval 20 ft. Edit. of June 1913.

Montana. Marias Pass Quad.* Surveyed in 1910-1911. 1:125,000. 48°30' - 48°0' N.; 113°30' - 113°0' W. Interval 100 ft. Edit. of May 1913.

[Represents the eastern edge of the Rocky Mountains where the Great Northern R.R. enters them. The northwestern corner is part of Glacier National Park; the topography of this section has already been published on the special map of Glacier National Park listed under "Montana (b)" in the *Bull.*, Vol. 44, 1912, p. 398.]

Nevada-California. Lida Quad. Surveyed in 1897-98, 1905 and 1911. 1:250,000. 38°0' - 37°0' N.; 118°0' - 117°0' W. Interval 100 ft. Edit. of Oct. 1913.

[Includes the northern end of Death Valley (the remainder of which, except for its southernmost end, is shown on the Ballarat and Furnace Creek sheets) and the Goldfield mining district.]

New York. Dannemora Quad.* Surveyed in 1911. 1:62,500. 44°45' - 44°30' N.; 73°45' - 73°30' W. Interval 20 ft. Edit. of June 1913.

Ohio. Newcomerstown Quad.* Surveyed in 1911. 1:62,500. 40°30' - 40°15' N.; 81°45' - 81°30' W. Interval 20 ft. Edit. of July 1913.

Ohio-Kentucky. Sciotoville Quad.* Surveyed in 1910-1911. 1:62,500. 39°0' - 38°45' N.; 83°0' - 82°45' W. Interval 20 ft. Edit. of June 1913.

Oklahoma. Vinita Quad. Surveyed in 1911-1912. 1:125,000. 37°0' - 36°30' N.; 95°30' - 95°0' W. Interval 50 ft. Edit. of June 1913.

Ontario-New York. Topographic Map of the Niagara Gorge. Surveyed (in 1912) in cooperation [by the] United States Geological Survey,

* On these sheets woods are shown in green.

George Otis Smith, Director, [and the] Geological Survey of Canada, Reginald W. Brock, Director. 1:12,000. 43°11.0' - 43°3.5' N.; 79°5.5' - 79°1.8' W. Interval 10 ft. 1913.

[Admirable large-scale map of the whole Niagara gorge from above Niagara Falls to below Lewiston. The Falls themselves, the rapids above and the Whirlpool Rapids below are graphically rendered by means of hachures and fine lines in blue to represent eddies, supplemented by white areas in the general blue tint for water to represent foam and spray. The other elements are represented in the usual manner of the Survey topographic sheets; but here again, due to the large scale, the delineation of city areas (Niagara Falls, N. Y. and Ont., are both shown on the map) is especially valuable.]

Pennsylvania. Stonesboro Quad.* Surveyed in 1911. 1:62,500. 41°30' - 41°15' N.; 80°15' - 80°0' W. Interval 20 ft. Edit. of July 1913.

Pennsylvania-Maryland. Gettysburg Battlefield and Vicinity. Surveyed in 1885 and 1906-09. 1:62,500. 40°0' - 39°30' N.; 77°30' - 77°0' W. Interval 20 ft. Edit. of May 1913.

[Special map prepared for the fiftieth anniversary of the battle of Gettysburg in July, 1913, by combining into one the Fairfield, Gettysburg, Emmitsburg and Taneytown sheets, previously published. See also August *Bulletin* (Vol. 45, 1913, No. 8), p. 616.]

Utah. Tintie Mining District. Surveyed in 1896-1897. Culture revised in 1911. 1:9,600. 39°58' - 39°54' N.; 112°8'30" - 112°5'30" W. Interval 20 ft. Edit. of July 1913.

Vermont. Woodstock Quad. Surveyed in 1910-1911. 1:62,500. 43°45' - 43°30' N.; 72°45' - 72°30' W. Interval 20 ft. Edit. of Aug. 1913.

Washington. Cedar Lake Quad.* Surveyed in 1910-1911. 1:125,000. 47°30' - 47°0' N.; 122°0' - 121°30' W. Interval 100 ft. Edit. of Apr. 1913.

West Virginia. (a) Beekley Quad.* Surveyed in 1911. 1:62,500. 38°0' - 37°45' N.; 81°15' - 81°0' W. Interval 50 ft. Edit. of June 1913.

(b) Logan Quad.* Surveyed in 1911. 1:62,500. 38°0' - 37°45' N.; 82°0' - 81°45' W. Interval 50 ft. Edit. of Aug. 1913.

(c) Louisa Quad.* Surveyed in 1911. 1:62,500. 38°15' - 38°0' N.; 82°45' - 82°30' W. Interval 50 ft. Preliminary edit. of June 1913.

[Map (a) covers the same territory as the northeastern quarter of the Raleigh, W. Va., sheet, map (b) as the northwestern quarter of the Oceana, W. Va.-Va.-Ky., sheet, and map (c) as the southeastern quarter of the Kenova, Ky.-W. Va.-O., sheet, all old sheets on the scale of 1:125,000. A comparison of the new sheets with the corresponding older sheets, especially in the early edition of 1886, brings out the great improvement in mapping methods made by the Survey since that time. The western two-thirds of map (c), which constitute Kentucky territory, are blank.]

CENTRAL AMERICA AND WEST INDIES.

Central America and West Indies. The National Geographic Magazine Map of Central America, Cuba, Porto Rico, and the Islands of the Caribbean Sea. Prepared by the American Bank Note Co. Gilbert H. Grosvenor, Editor. 1:9,000,000. 31° - 6° N.; 100° - 59° W. 10 colors. With inset: (1) [Panama Canal Zone]. [1:700,000]. 9°30' - 8°45' N.; 80°5' - 79°20' W. Oriented N. 44° W. 5 colors. (2) [Profile of Canal, horizontal scale 1:700,000, vertical scale 1:7,000]. Accompanies "The Countries of the Caribbean" by W. J. Showalter, *Natl. Geogr. Mag.*, Vol. 24, 1913, No. 2, pp. 227-249.

[Very serviceable map, primarily of a political nature, of the American Mediterranean region. Commerce is especially emphasized, steamship routes, with distances, railroads, wireless telegraph stations, coaling stations and seats of U. S. consular representatives (consul generals, consuls, and consular agents

* On these sheets woods are shown in green.

differentiated) being shown in red. The configuration of the ocean floor is shown by means of isobaths (50, 100, 500, 1,000 and 2,000 fathoms) and tints of blue. With regard to the latter it would have been preferable to begin the markedly deeper tone of blue at the 100 fathom rather than at the 2,000 fathom line; this would have brought out properly the relation of the continental shelf to the true pelagic depths. The Porto Rico Trough might also have been shown graphically rather than by two soundings only. A less cumbersome and equally comprehensive title would have been "Map of Central America and the West Indies."

But it is mainly because of the manner of its reproduction that this map merits attention here, for, in the field of cartography as practiced by American commercial map publishing firms, it represents a decided advance. This is principally due to the fact that the esthetic requirements of a map have been recognized: the crude type lettering of wax-engraved maps has been replaced by drafted lettering. This has been done without resorting to the laborious—although admirable in its results—lithographic method used by European cartographic establishments: the manuscript drawing has simply been turned into a line cut—the same process as that used for the maps in the *Bulletin*. Another improvement is the greater care given to the colors (faint ruling being used, instead of the halftone and other methods of wax-engraved maps, to obtain areal tints) and, above all, to color registration. Although on the specimen of the map contained in the copy of the magazine accessible to the reviewer the colors do not always register perfectly, a proof of the same map shows that this desideratum can be attained.

Previous efforts of the map department of the American Bank Note Co., notably the physical maps of the continents in Salisbury, Barrows and Tower's Elements of Geography and Modern Geography for High Schools, have shown it to be alive to higher standards. Continued advance along the same lines can do much towards alleviating the present woeful condition of American non-governmental cartography and may afford the possibility of satisfying the demand, increasingly felt in educational and other circles, for better maps made in this country.]

SOUTH AMERICA

Argentina. Sierra de la Lumbra (République Argentine). 1:1,000,000. 23°42' - 25°25' S.; 65°10' - 64°10' W. Accompanies, as Fig. 1 on p. 339, "La Sierra de la Lumbra" by P. Denis, *Ann. de Géogr.*, No. 124, Vol. 22, 1913, July 15, pp. 337-352.

[The Sierra de la Lumbra is an eastern outlier of the Andes, separated from them by the broad valley of the San Francisco River, to the east of Jujuy.]

AFRICA

Madagascar. (a) Schéma tectonique de la région située entre Tananarive et Mevatana. 1:1,500,000. [16°53' - 19°5' S.; 46°20' - 47°35' E.]

(b) Calque tectonique de la région d'Andribe, dressé par le Capitaine de Martonne. 1:200,000. [17°35' S. and 46°30' E.]

(c) Carte schématique de la région Mevatana-Majunga. 1:1,500,000. [15°35' - 17°10' S.; 45°30' - 47°20' E.]

Accompany, as Figs. 1, 4 and 8 on pp. 3, 11 and 22, respectively, "Une mission géodésique à Madagascar" by Capt. Carrier, *La Géogr.*, Vol. 28, 1913, No. 1, pp. 1-26.

Sahara. The Libyan Desert to illustrate a paper by W. J. Harding King. 1:7,500,000. 33° - 12½° N.; 16° - 34° E. 1 color. Accompanies "The Libyan Desert from Native Information" by W. J. Harding King, *Geogr. Journ.*, Vol. 42, 1913, No. 3, pp. 277-283.

[Valuable contribution to our knowledge of the eastern Sahara, the largest continuous unknown area in Africa. The original parts of the map are based

mainly on the information of an Arab, a native of Kufra oasis, who had for about six years been a tax collector among the Bedayat for the Sultan of Darfur. His information relates mainly to the region between Kufra and Darfur and between Darfur and Dongola on the Nile. In the former region the most outstanding feature is the Wadi el Fardi, which is said to rise on the northern slopes of Tibesti, to flow north to Kufra oasis, which it may supply with water underground, and possibly finally to discharge into Siwa oasis. It might thus be considered the eastern counterpart of the Wadi Igharghar in the western Sahara. In the region between Darfur and Dongola a similar dry watercourse, the Wadi Howar, is said to extend from the Jebel Hareja (15° N. and 22° E.) on the northern confines of Darfur northeast to the Nile below Dongola.]

ASIA

Russian Central Asia. Tektonische Karte des Kalbinski-Gebirges in Westsibirien. Von W. A. Obrutschew. 1:1,750,000. $50^{\circ}30' - 47^{\circ}50'$ N.; $80^{\circ}0' - 85^{\circ}50'$ E. 2 colors. Accompanies, as Taf. 25, "Das Kalbinskigebirge im westlichen Altai in orographischer und geologischer Beziehung" by W. Obrutschew, *Pet. Mitt.*, Vol. 59, II, 1913, Sept., pp. 128-132.

[The Kalbinski Mountains are a western outlier of the Altai lying beyond the Irtysh River. Granite massifs, faults and gold mines are distinguished on the map.]

Turkey in Asia. A. Philippson: Geologische Karte des westlichen Kleinasiens, Blatt 2. 1:300,000. $40^{\circ}32' - 38^{\circ}59'$ N.; $28^{\circ}10' - 30^{\circ}26'$ E. 25 colors. Accompanies "Reisen und Forschungen im westlichen Kleinasien. III. Heft: Das östliche Mysien und die benachbarten Teile von Phrygien und Bithynien" by A. Philippson, *Ergänzungsheft zu Pet. Mitt. Nr. 177*, 1913.

[The third sheet published of this admirable six-sheet geological map of western Asia Minor by Professor Philippson of which Blatt 1 and 3 were listed respectively under "Asia Minor" and "Turkey in Asia" in the *Bull.*, Vol. 43, 1911, p. 708, and Vol. 44, 1912, p. 559. Twenty-two geological subdivisions are shown. For the topographical map which forms the basis of the geological map see immediately below.]

Turkey in Asia. Topographische Karte des westlichen Kleinasien nach eigenen Aufnahmen . . . entworfen von Dr. Alfred Philippson. 1:300,000. [Two sheets:] Blatt 5 [with title of whole series]. $37^{\circ}27' - 35^{\circ}54'$ N.; $25^{\circ}57' - 28^{\circ}10'$ E. 8 colors. Blatt 6. $37^{\circ}28' - 35^{\circ}54'$ N.; $28^{\circ}10' - 30^{\circ}24'$ E. 8 colors. Justus Perthes, Gotha, 1913. Price of the two sheets together, M. 8.

[The final sheets of a series of which the earlier sheets have been listed under "Asia Minor" in previous numbers of the *Bull.*, as follows: Blatt 1 and 3, Vol. 43, 1911, pp. 548-549 (with detailed comment on the whole series); Blatt 2 and 4, Vol. 45, 1913, p. 318. Blatt 5 and 6 show the southwesternmost corner of Asia Minor and the Sporades from Patmos to Rhodes, inclusive.]

AUSTRALASIA AND OCEANIA

New Zealand. Map of the Middle Clarence Valley, Marlborough, New Zealand. (Topography from maps by the N. Z. Lands and Survey Department). [1:800,000]. [$42^{\circ}0' - 42^{\circ}30'$ S.; $172^{\circ}55' - 174^{\circ}0'$ E.] Accompanies, on p. 226, "The Physiography of the Middle Clarence Valley, New Zealand" by C. A. Cotton, *Geogr. Journ.*, Vol. 42, 1913, No. 3, pp. 225-246.

EUROPE

France. Carte des gisements de minerai en fer en Normandie, Anjou et Bretagne. Cliché communiqué par la *Revue scientifique*. [1:1,650,000]. [$49^{\circ}45' - 47^{\circ}20'$ N.; $3^{\circ}10' - 0^{\circ}15'$ E.] Accompanies, as Fig. 10 on p. 29, "Les minerais de Normandie et de Bretagne" by P. Lemoine, *La Géogr.*, Vol. 28, 1913, No. 1, pp. 27-34.

POLAR

Antarctic. (a) Antarctide Sud-Américaine et Iles Environnantes, des Iles Shetlands du Sud à la Terre Charcot, dressée par Mr. M. Bongrain, Lieutenant de Vaisseau, d'après les travaux les plus récents. Mercator's projection, [equatorial scale, 1:3,700,000; mean meridional scale, 1:1,500,000]. 61°-70° S.; 77°-53° W. 1 color. With five insets: (1) Mouillage de l'Ile Déception (Iles Shetlands du Sud). 1:50,000. 62°55' S. and 60°38' W. 1 color. (2) Mouillage de la Baie de l'Amirauté (Ile du Roi Georges). 1:100,000. 62°6' S. and 58°37' W. 1 color. (3) Port Charcot (Ile Wandel). 1:5,000. 65°4' S. and 64°2' W. 1 color. (4) Port Lochroy (Ile Wieneke). 1:20,000. 64°50' S. and 63°29' W. 1 color. (5) Port Circoncision (Ile Petermann). 1:4,065. 65°11' S. and 64°10' W. 1 color.

(b) Carte Général des Terres Explorées, de la Baie Pendleton à la Terre Charcot. Plan levé par Mr. M. Bongrain, Lieutenant de Vaisseau, à bord du "Pourquoi Pas?". Mercator's projection, [equatorial scale, 1:1,850,000; mean meridional scale, 1:700,000]. 1 color. With two insets: (1) Croquis du Fiord Lallemand. 1:200,000. [67° S. and 67½° W.] 1 color. (2) Croquis des Environs de l'Ile Jenny. 1:200,000. [67°45' S. and 68°30' W.] 1 color.

(c) Carte du Secteur d'Hivernage. Plan levé par Mr. M. Bongrain, Lieutenant de Vaisseau à bord du "Pourquoi Pas?". 1:200,000. [65°5' - 65°53' S.; 65°15' - 63°40' W.] 1 color.

(d) Environs de la Station d'Hivernage. Plan levé par Mr. M. Bongrain, Lieutenant de Vaisseau, à bord du "Pourquoi Pas?". 1:66,666. [65°5' - 65°37' S.; 64°24' - 63°48' W.] 2 colors.

(e) Ile Petermann (Lund). Plan Levé par Mr. R. E. Godfroy, Enseigne de Vaisseau à bord du "Pourquoi Pas?". 1:4,065. [65°11' S. and 64°11' W.] 1 color.

(f) Port Circoncision (Ile Petermann). Plan des installations au poste d'hivernage levé par Mr. R. E. Godfroy, Enseigne de Vaisseau à bord du "Pourquoi Pas?". 1:1,000. [65°11' S. and 64°11' W.] 1 color.

(g) Carte d'Itinéraire de la Campagne d'Été de 1909. Dressée par Mr. M. Bongrain, Lieutenant de Vaisseau à bord du "Pourquoi Pas?". Mercator's projection, [equatorial scale 1:3,700,000; mean meridional scale 1:1,500,000]. 62°24' - 70°0' S.; 75°40' - 59°40' W.] 6 colors.

(h) Carte d'Itinéraire de la Campagne d'Été de 1910. Dressée par Mr. M. Bongrain, Lieutenant de Vaisseau à bord du "Pourquoi Pas?". Mercator's projection, [equatorial scale, 1:11,000,000; mean meridional scale, 1:5,000,000]. 51½° - 72° S.; 123½° - 52½° W. 5 colors.

(i) Baie de l'Amirauté, Ile du Roi Georges, d'après le levé exécuté par Mr. M. Bongrain, Lieut't. de V'au. 1:50,000. 62°6' S. and 60°37' W.

(j) [Two maps:] (1) Ile Déception, Shetlands du Sud, d'après le levé exécuté par Mr. Bongrain, Lieut't. de V'au. 1:50,000. 62°55' S. and 60°38' W. (2) Passe du Challenger et Anse des Baleiniers, Ile Déception. 1:10,000. Practically same coordinates as (1). With one inset: Pendulum Cove, Ile Déception. 1:10,000. 62°55' S. and 60°38' W.

(k) Shetlands du Sud et Côte Nord de l'Antarctide Sud-Américaine. Carte dressée par M. le Lieutenant de Vaisseau Bongrain. Mercator's projection, [equatorial scale, 1:1,850,000; mean meridional scale, 1:830,000].

Accompany, as Pls. I-XI, respectively, in separate pocket entitled "Cartes," "Deuxième Expédition Antarctique Française (1908-1910) commandée par le Dr. Jean Charcot: Sciences Physiques, Documents Scientifiques," Paris, 1912.

[Important maps embodying the results of Charcot's recent Antarctic expedition of 1908-1910. Maps (a), (g) and (h) are general maps, while (b), (c), (d), (e) and (f) are maps of the various localities that were surveyed in detail. Maps (i), (j) and (k) are copies of the official charts of the French Hydrographic Office (Nos. 5448, 5449 and 5425, respectively) recently issued on the basis of the surveys of the expedition.

Of the general maps, map (a) gives a survey of the whole of West Antarctica (here appropriately termed South American Antarctic). The new land discoveries of the Charcot expedition relate mainly to the islands south of the

Biscoe group, whose insularity and detachment from the mainland of the West Antarctica peninsula it has established. The special field of exploration of the expedition, including Adelaide Island, Alexander I Land (probably also an island) and Terre Charcot are shown in greater detail on map (b). Maps (g) and (h) show the water route of the expedition, map (h) containing the portion of the route which demonstrated that along the 70th parallel no land occurs west of West Antarctica at least as far as 121° W. On both the latter maps ice conditions are shown, distinction being made between dense and loose pack ice and icebergs.]

WORLD AND LARGER PARTS

Alps, Caucasus, Central Asia, etc. (a) Schneegrenzkarte der Alpen. [1:5,000,000]. [48°-44° N.; 4½°-15½° E.] 1 color.

(b) Schneegrenzkarte des Kaukasus. [1:3,750,000]. 44°-40½° N.; 39¾°-50° E. 5 colors.

(c) Schneegrenzkarte Mittelasiens. [1:30,000,000]. 50°-21° N.; 60°-100° E. 5 colors.

(d) Schneegrenzkarten Skandinaviens. [1:20,000,000]. [72°-53° N.; 4°-32° E.] (1) Klimatische Schneegrenze und Julisothermen. 2 colors. (2) Orographische Schneegrenze und Niederschlagsmengen in Zentimetern. 5 colors.

(e) Isochionen der Nordpolarländer. [Mercator's projection; equatorial scale, 1:245,000,000]. [Zone between 81°-50° N.] (1) Isochionen der Nordpolargebiete. 1 color. (2) Julisothermen der Nordpolargebiete. 3 colors.

Accompany, as Taf. 1-3, "Die Schneegrenze in verschiedenen Klimaten" by V. Paschinger, *Ergänzungsheft zu Pet. Mitt. Nr. 173*, 1912.

[Suggestive maps of the snow limit in various parts of the world. On maps (a), (b) and (c), diagrammatic crest lines are used to differentiate between the various altitudes of the snow lines in the mountains represented. On the map of the Caucasus (b) in addition is shown the extent of the various climatic regions, on the map of Central Asia (c) the precipitation, after Supan, and the July isotherms, after Hann. Map (e₁) shows the lines of equal snowfall for the Arctic regions, map (e₂) cold and warm currents in addition to the July isotherms.]

World. Eisenerzkarte der Erde nach dem Stande der Eisenerzforschung i. J. 1911, entworfen von Max Eckert. [Eckert's equivalent projection,] 1:90,000,000. 5 colors. Accompanies as Taf. IX, "Die Eisenvorräte der Welt" by M. Eckert, *Geogr. Zeitschr.*, Vol. 19, 1913, No. 5, pp. 266-285.

[Suggestive map of the iron ore resources of the world. Distinction is made between countries whose iron ore resources have been investigated (1) practically completely, (2) partly, (3) insufficiently or (4) not at all. Appropriate symbols indicate the grade of ore mined in the chief producing areas (5 symbols), the amount of ore mined in (8 symbols), and the resources of, each country. The latter element is represented by colored circles—blue for countries for which the statistics are known, red for those for which they are only estimated—whose areas bear a definite ratio to the amount designated.]

World. Übersicht der erdmagnetischen Observatorien 1913, zusammengestellt von Prof. Dr. Karl Schering. Mercator's projection: equatorial scale, 1:80,000,000. With inset: Erdmagnetische Observatorien in Europa (mit Ausnahme von Russland). 1:20,000,000. 60°-35° N.; 20° W.-35° E. 1 color. Accompanies, as Taf. 30, "Karte der erdmagnetischen Observatorien" by K. Schering, *Pet. Mitt.*, Vol. 59, II, 1913, Sept., p. 146.

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ERRATA

- p. 56, line 1 of first title under Africa, for "Deudûr" read "Dendûr"
- p. 68, line 15 from top, for "Illinois" read "Illinois"
- p. 70, line 1 of first subdivision under Africa, for "Le" read "Les"
- p. 72, line 3 under Australia, for "Le" read "La"
- p. 73, line 1 under Austria, for "von" read "vom"
- p. 73, line 2 of third entry under France, for "tectioniques" read "tectoniques"
- p. 73, line 2 of second entry under Iceland, add sub-title "I. Die Reise durch Island 1912"
- p. 74, line 1 of second entry under Physical Geography, for "Bauers" read "Bauer"
- p. 75, line 1 of third entry under Mathematical Geography, for "Closterhafen" read "Closterhalfen"
- p. 81, line 3 from bottom, for "Gazeteers" read "Gazetteers"
- facing p. 91, line 2 of Fig. 14, for "costal" read "coastal"
- p. 141, line 3 of review of The Guardians of the Columbia, for "sentinals" read "sentinels"
- p. 144, line 1 of third entry under Europe, for "Départment" read "Département"
- p. 152, heading of third subdivision under Australasia and Oceania, for "Kaiser Wilhelm Land" read "Kaiser Wilhelms Land"
- p. 191, line 20 from top, "Fogausa" is correct although wrongly alphabetized
- p. 205, line 4 of second item under Obituary, for "his as his companion" read "him as his companion"
- p. 226, line 1 of fourth and sixth entries from bottom, for "Départment" read "Département"
- p. 228, line 1 of seventh entry under United States, for "MacFarlane" read "Macfarlane"
- p. 229, line 1 of third entry, for "States" read "State"
- p. 229, line 1 of fourth entry under British Guiana, before "A Ten Years' Review" add "The Colony's Foreign Trade:"
- p. 233, line 1, for "Ständigen" read "ständigen"
- p. 244, lines 2 and 3 from bottom, for "there shall be imposed" read "there shall not be imposed"
- p. 294, line 1 of second title, for "Problèmes" read "Problèmes"
- p. 302, line 1 of title under Polar, for "Antarctic" read "Antarctique"
- p. 303, line 1 of title under Anthropogeography, for "süditaliens" read "Südtaliens"
- p. 307, line 4 from top, for "ursprung" read "Ursprung" and for "Weltgebäudes" read "Weltgebüdes"
- p. 311, line 1 of fifth entry, for "MacFarlane" read "Macfarlane"
- p. 313, line 3 from bottom, for "Consideration" read "Considerations"
- p. 374, second title under Asia, for "Une Colonie Modèle la Birmanie . . ." read "Une Colonie Modèle: La Birmanie . . ."
- p. 377, line 1 of first title, for "Quadalquivir" read "Guadalquivir"
- p. 384, line 1 of entry under South America, for "Argentine" read "Argentinien"
- p. 413, line 1 of article, for "March 16 to 28" read "March 16 to 27"
- between pp. 420 and 421, on title of map, for "Mecator's Projection" read "Mercator's Projection"
- p. 466, line 2 of third entry from bottom, for "Tuscon" read "Tucson"
- p. 475, line 1 of fifth entry, for "Reeves, A. E." read "Reeves, E. A."
- p. 511, legend on map, under "continental shelf", for "(ocean above 200 meter depth)" read "(land between sea level and 200 meter depth)"
- p. 554, line 1 of third entry under The World and Parts of It, for "DEFANT, A. R. v. STERNECK:" read "DEFANT, A.: R. v. Sterneck". (The second name is part of the title of the paper)
- p. 556, line 3 of first entry under Alaska, for "Griffin" read "Giffin"
- p. 610, line 27 from bottom, for "1912-13", read "1912"
- p. 611, insert, in list of maps, between 11 and 12:
- 11a. (a) Northern Part of the Dominion of Canada illustrating the journey of David T. Hanbury. 1901-1902. 1:3,500,000. (b)—illustrating the Geological Notes of David T. Hanbury. 1:3,500,000. Accompany "Sport and Travel in the Northland of Canada" by D. T. Hanbury, London (Arnold), 1904.
- Map (a) also accompanies *Geogr. Journ.*, Vol. 23, 1903, No. 2
- p. 638, last line, for "Hessia" read "Hesse"
- p. 671, line 4 of article, for "Vol. 45" read "Vol. 44"
- p. 712, line 3 from bottom, for "Henning" read "Hennig"
- p. 716, line 1 of first entry under North America, for "Grand" read "Grands"; line 2, for "le Carte" read "la Carte"

- p. 717, line 1 of first entry under Africa, for "Algerie" read "Algérie "
- p. 717, line 2 of fourth entry under Africa, for "and" read "und "
- p. 764, line 2 of first item under Australasia and Oceania, for "T. W. Edgeworth Davis " read "T. W. Edgeworth David "
- p. 772, line 1 of second title, for " indigène " read " indigène "
- p. 781, line 4 from bottom for "AND " read " Et "
- p. 787, line 1 of third entry under Africa, after " Südwestafrikas " add " Kolon. Zeitschr. "
- p. 787, third entry under Africa should be classified under German Southwest Africa on p. 788
- p. 789, line 1 of entry under Spanish Guinea, for "Annoben " read "Annobon "
- p. 791, first entry under Australasia and Oceania should be classified under Australia, the third entry and the third subdivision (Java) under Asia.
- p. 798, the entry under Spain should have been inserted under Mexico on p. 785
- p. 823, line 1 of footnote 4a, for "Black " read "Black "
- p. 825, line 18 from bottom, for "as of Switzerland " read "as Switzerland "
- p. 830, line 3 from top, for "Greece " read "the Greeks "
- p. 856, lines 13 and 14 from bottom, for "Foreign Member of the Academy of Sciences " read "Foreign Associate of the National Academy of Sciences "
- p. 858, line 12 of first review, for "scarcly " read "scarcely "
- p. 872, line 1 of entry under German New Guinea for "Neumeckklenburg " read "Neumecklenburg "
- p. 940, line 3 of right-hand column, for "Einfache " read "einfache "
- p. 948, line 1 of first entry under China for "Fluvial " read "Fluviale "
- p. 954, line 1 of fourth entry under Teaching and Methodology for "Inst." read "Ist."
- p. 959, line 1 of second paragraph for "Général " read "Générale "

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